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Systematics of the family Ariidae (Ostariophysi, Siluriformes), with a redefinition of the genera

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Abstract

The taxonomic *status* of all the nominal genera of the Ariidae are reviewed and ariid genera are diagnosed by exclusive characters as well as by a combination of internal and external morphological features. The results are based on a phylogenetic analysis undertaken by the senior author (Marceniuk, 2003). The species so far recognized are taxonomically reevaluated and considered as valid, *inquirendae* or synonyms under each diagnosed genus based on direct examination of specimens or use of diagnostic characters available in the literature. A key to identification of genera is provided based on morphological characters that can be easily recognized. In the new classification proposed, Ariidae comprises the following twenty six valid genera: *Amissidens*, *Arius*, *Aspistor*, *Bagre*, *Batrachocephalus*, *Brustiarius*, *Cathorops*, *Cephalocassis*, *Cinetodus*, *Cochlefelis*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Genidens*, *Hemiaris*, *Ketengus*, *Nedystoma*, *Nemapteryx*, *Neoarius*, *Netuma*, *Notarius*, *Osteogeneiosus*, *Pachyula*, *Plicofollis*, *Potamarius* and *Sciades*. Three new genera are erected. The nominal genera *Bagre* Oken, 1817, *Glanis*, *Stearopterus*, *Breviceps non* Merrem, 1820, *Felichthys*, *Ailurichthys*, *Mystus non* Scopoli, 1777 and *Anemanotus* are considered junior synonyms of *Bagre* Cloquet, 1816. *Hexanematichthys*, *Sciadeichthys*, *Selenaspis*, *Ariopsis* and *Leptarius* are synonyms of *Sciades*. The nominal genus *Pseudarius* is an objective synonym, and *Ariodes* a subjective synonym, of *Arius*. *Sciadeops* is synonymous with *Notarius*. *Catastoma* and *Sarcogenys* are synonyms of *Netuma*. *Tetranesodon* is preliminary considered junior synonym of *Pachyula*. *Hemipimelodus* is a synonym of *Cephalocassis*. *Septobranchus* is a junior synonym of *Cinetodus*, and *Guiritinga* is a new synonym of *Genidens*.

Key words: Ariidae, Systematics, Revision of Genera

Introduction

The Ariidae are widely distributed, most of its species occurring along tropical and temperate areas of the world in coastal waters of the continents, estuarine regions and lower portions of coastal rivers. A restricted number of species is either entirely confined to marine waters where they can be found at depths of 150 meters or to fresh waters in the upper courses of rivers 500 kilometers away from their mouths.

The group was established by Bleeker (1862) as *Phalanx* Arii and formally defined by Regan (1911). Since then the inaccurate description of new taxa sometimes based on ontogenetic phases of the same species or on sexual differences added to the proliferation of names. The genera presently recognized were primarily defined on the basis of traditional morphological characters, such as shape of tooth plates, eye position on head, presence or absence of skin over the eye, extension of the branchial opening, type of ornamentation of skull bones, number and shape of barbels, etc., presently considered inconsistent or of limited information (pers. obs.).

Lack of adequate comparative material in studies of systematics and taxonomy of the Ariidae led to the recognition of species from widely separated regions of the world under the same generic name and this is reflected in classifications proposed during the 19th century (Cuvier & Valenciennes, 1840a, 1840b; Bleeker, 1858, 1863; Günther, 1864). Later on new genera and classifications were established based on geographic distribution of species involving faunas of different regions such as: Africa and Asia (Chaudhuri, 1916; Herre, 1926; Fowler, 1936, 1941; Chandy, 1953; Misra, 1959; Tobor, 1969; Jayaram & Dhanze, 1978; Jayaram, 1982, 1984; Taylor, 1986); Australia and Papua New Guinea (Weber & Beaufort, 1913; Hardenberg, 1941, 1948; Roberts, 1978; Kailola, 1999) and Americas (Jordan & Gilbert, 1883; Eigenmann & Eigenmann, 1890; Jordan & Evermann, 1898; Meek & Hildebrand, 1923; Gosline, 1945; Fowler, 1951; Taylor & Menezes, 1977; Figueiredo & Menezes, 1978; Kailola & Bussing, 1995; Acero, 2003).

More recently attempts have been made to redefine genera and to establish generic relationships, but primarily based on similarity of external characters not on presence of shared derived characters as proposed by the cladistic method (Hennig, 1950, 1966). Tilak (1965) primarily using characters associated with skull bones and the Weberian apparatus of species from India redefined some of the ariid genera and suggested that the characters he found could be used for species and genera worldwide. Higuchi (1982) however, studying the osteology of five species from southeastern and southern Brazil concluded that Tilak's characters were not useful to diagnose genera from the Atlantic Ocean. Jayaram & Dhanze (1986) tried to define relationships among ariid genera from India also based on osteological and other morphological characters. They recognized two main "evolutionary lines", one including the apparently closely related genera *Ketengus* and *Batrachochephalus* and the other the genus *Arius*, more specialized. *Osteogeneiosus* was considered the basal unit. However, no evidence that he was dealing with monophyletic groups was presented.

The major difficulties in undertaking a comprehensive study on the systematics of the Ariidae in order to provide a better definition of the included genera and to study their relationships is the great diversity and wide distribution of the group. Many of the species are rare in museum collections and are not available for anatomical studies. Recent studies of the phylogenetic relationships of ariid genera (Kailola, 1990a, 2004; Betancur-R, 2003; Betancur-R & Acero, 2004; Betancur-R *et al.*, 2004) are geographically restricted and do not take into account species of many of the known ariid genera (see Discussion and comparison with previous classifications below).

In spite of the array of controversies concerning definition of genera and their relationships within the Ariidae, the monophyletic condition of the family was never seriously questioned. First considered as relatively primitive or "generalized in form and structure" during pre-cladistic studies (Regan, 1911; Berg, 1940), Ariidae was considered more primitive than Doradidae, Plotosidae, Schilbeidae and Bagridae an opinion not shared by Sheldon (1937), Tilak (1963, 1965, 1967), Greenwood *et al.* (1966) and Chardon (1968). Using cladistic methodology, Mo (1991), Lundberg (1993) and de Pinna (1993) confirmed Ariidae as a monophyletic group. The first two suggested Doradoidea as the ariid sister group, but de Pinna (1993) attributed this condition to family Claroteidae and both this family and Ariidae would be the sister group of Schilbeidae and Pangasiidae. A similar conclusion was reached by de Britto (2002). Later on de Pinna (1998) also recognized Doradoidea as the sister group of the Ariidae.

The main objective in the present work is to revise and redefine the taxonomic *status* of ariid nominal genera using exclusive internal and external morphological characters and a combination of morphological characters and to propose a new species arrangement within the valid genera, examining the largest possible number of ariid representatives. The phylogenetic analysis is the subject of a future publication.

Materials and methods

The primitive or derived conditions of the characters used in the diagnoses and definitions of the genera have

been evaluated in the study of phylogenetic relationships within the Ariidae undertaken by Marceniuk (2003) and are not discussed in the present work. This study is presently being revised and enlarged for publication (Marceniuk & Menezes, in preparation) and contains hypotheses of relationships and a discussion of the monophyletic condition of ariid internal groups. In Marceniuk & Menezes (in preparation), the examined characters will be described and the coded data matrix, phylogenetic analysis including details of methodology, character optimizations and measures of support for clades will be presented. In the present work, we used exclusive characters as well as a combination of morphological characters easily discernible, in the process of reviewing and redefining the *status* of ariid nominal genera. The external and internal morphological characters that appear in generic diagnoses are most of the times unique within the Ariidae. However, some genera in which unique characters are few or not present at all are diagnosed by an exclusive combination of characters and the taxa that share the same condition are cited between parentheses. In addition the exclusive features that form the diagnoses, a combination of supplementary morphological characters are also used to help the identification of each genus and a key for identification of the genera.

The decision to include species whose osteological and myological characters were not analyzed in the respective genera, was based on observation of shared similarities of external characters in preserved specimens or depicted in the literature. The ariid material examined is listed under each species recognized within each genus. The material examined is the same analyzed by Marceniuk (2003). A special effort was made to include type-species of all the genera involved as well as representatives of all available species currently recognized as taxonomically valid in the literature. When the type-species was not available the most similar species to the type-species was chosen. For example, *Potamarius izabalensis* Hubbs & Müller (1960) was examined because no specimens of *P. nelsoni* Evermann & Goldsborough (1902), type-species of the genus were available.

The list of synonyms for each species is primarily based on the literature and in this respect should be considered preliminary. Since this work focus mainly on the revision of the genera, information on synonymy, distribution and habitat of the included species do not mean to be complete and were added with the objective to provide a summary of what is known about these topics. Unless otherwise stated, synonymies are based on literature data included in the following papers: Jayaram & Dhanze, 1978; Roberts, 1978, 1989; Higuchi *et al.*, 1982; Taylor, 1986, 1990; Kailola, 1986, 1999, 2000a, 2000b, 2004; Burgess, 1989; Paxton *et al.*, 1989; Allen, 1991; Talwar & Jhingran, 1991; Cervigón, 1992; Daget, 1992; Kottelat *et al.*, 1993; Bussing & López, 1994; Kailola & Bussing, 1995; Kottelat & Lim, 1995; Mohsin & Ambak, 1996; de La Cruz Agüero *et al.*, 1997; Larson & Williams, 1997; Aguilera, 1998; Chirichigno & Vélez, 1998; Martin-Smith & Tan, 1998; Castro-Aguirre *et al.*, 1999; Mishra & Srinivasan, 1999; Le Bail *et al.*, 2000; Tan & Ng, 2000; Camargo & Isaac, 2001; Hutchins, 2001; Kottelat, 2001; Acero & Betancur-R, 2002a, 2002b; Acero, 2003; Khan, 2003; Manilo & Bogorodsky, 2003; Marceniuk & Ferraris, 2003; Ng & Sparks, 2003; Ng, 2003; Betancur-R & Acero, 2004; Betancur-R *et al.*, 2004; Heemstra & Heemstra, 2004; Nelson *et al.*, 2004; Marceniuk, 2005a, 2005b. In addition to literature information, more precise distributional data are based on examined material. Distributions of genera are based on species directly examined.

All anatomical drawings were made under a stereomicroscope using camera lucida. Not all structures associated with the characters discussed are illustrated, only those that we found essential for understanding the nature of the character. Cleared & stained specimens (c&s) were stored in glycerin, but dry skeletons (es) and whole specimens stored in alcohol (al) were examined. Clearing and counterstaining osteological preparations for cartilage and bone were performed through the methods of Dingerkus & Uhler (1977) and Taylor & Van Dyke (1985). Names of bones are according to Weitzman (1962), Patterson (1975), Arratia (1990), Arratia & Schultz (1990, 1991). Number of vertebrae refers to all the vertebral elements, including those of the Weberian apparatus.

Abbreviations

Abbreviations for institution names are those of Levinton *et al.* (1985) and Levinton & Gibbs (1988) except for the following:

BSMP	Department of Agriculture, Bureau of Science, Manila, Philippines.
MOFURG	Museu Oceanográfico, Fundação Universidade de Rio Grande, Rio Grande do Sul, Brazil.
MZUB	Museo di Zoologia dell'Università degli Studi di Bologna, Italy.
NMSZ	National Museum of Scotland, Edinburgh, Scotland.

Family Ariidae Bleeker, 1862

Arii Bleeker, 1862: 7, 25. Type genus: *Arius* Valenciennes in Cuvier & Valenciennes, 1840b.

Hemipimelodinae Gill, 1861: 46. Type genus: *Hemipimelodus* Bleeker, 1858.

Batrachocephalinae Gill, 1893: 132. Type genus: *Batrachocephalus* Bleeker, 1846.

Doiichthyidae Weber, 1913: 532. Type genus: *Doiichthys* Weber, 1913.

Bagreidae Schultz, 1944: 182. Type genus: *Bagre* Oken, 1817.

Osteogeneiosinae Fowler, 1951: 3. Type genus: *Osteogeneiosus* Bleeker, 1846.

Vorhisiidae† Frizzell, 1965: 179. Type genus: *Vorhisia*† Frizzell, 1965.

Diagnosis. The family Ariidae can be distinguished from all other Siluriformes by the following characters: external posterior branch of lateral ethmoid columnar; a bony blade anteriorly connecting the nasal tubules; lateral ethmoid and frontal bones connected mesially and laterally delimiting a fontanel (fig. 1) (shared with Pangasiidae and Schilbeidae); presence of three infraorbitals (fig. 2) (shared with Doradidae, Mochokidae and Pimelodidae); lachrymal well developed (fig. 3); space between transcapular process and otic capsule small; otic capsules enlarged; wing process of parasphenoid present (shared with Bagridae and Schilbeidae); subvertebral process well developed (fig. 4); anterior portion of second basibranchial expanded and very conspicuous (fig. 5); third pharyngobranchial boomerang shaped (fig. 6); anterior portion of proximal cartilage of fourth ceratobranchial narrow about one-half as wide as posterior portion; dorsal processes of pharyngeal tooth plates long (fig. 7); anterior and posterior nostrils close together (shared with Diplomystidae).

Remarks. To be consistent with the results of the phylogenetic analysis reported by Marceniuk (2003) in order to accommodate all the names available without creating unnecessary nomenclatural conflicts, the following genera are recognized: *Amissidens*, *Arius*, *Aspistor*, *Bagre*, *Batrachocephalus*, *Brustiarius*, *Cathorops*, *Cephalocassis*, *Cinetodus*, *Cochlefelis*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Genidens*, *Hemiaris*, *Ketengus*, *Nedystoma*, *Nemapteryx*, *Neoaricus*, *Netuma*, *Notarius*, *Osteogeneiosus*, *Pachyula*, *Plicofollis*, *Potamarius* and *Sciades*. Three new genera have to be erected: *Amphiaris*, *Carlarius* and *Potamosilurus*. The nominal genera *Bagre* Oken, 1817, *Glanis*, *Stearopterus*, *Breviceps* non Merrem, 1820, *Felichthys*, *Ailurichthys*, *Mystus* non Scopoli, 1777 and *Anemanotus* are junior synonyms of *Bagre* Cloquet, 1816. *Hexanematichthys*, *Sciadeichthys*, *Selenaspis*, *Ariopsis* and *Leptarius* are synonymous with *Sciades*. The nominal genus *Pseudarius* is an objective synonym and *Arioides* is subjective synonym of *Arius*. *Sciadeops* is synonymous with *Notarius*. *Catastoma* and *Sarcogenys* are synonymous with *Netuma*. *Tetranesodon* is tentatively recognized as synonym of *Pachyula*. *Hemipimelodus* is synonymous with *Cephalocassis*. *Septobranchus* is a junior synonym of *Cinetodus*. *Guiritinga* is a new synonym of *Genidens*.

The genus *Doiichthys* formerly considered the single representative of the family Doiichthyidae by Weber & de Beaufort (1913) and Berg (1940) and not examined either by Mo (1991) or de Pinna (1993), shares a series of synapomorphies with the other members of the Ariidae (Kailola, 1990a, 2004; Marceniuk, 2003) and is included in this family. The nominal genus *Tachysurus* (Lacépède, 1803) as already noted by Regan (1907) cannot be recognized in the Ariidae contrary to the conclusion of Eigenmann & Eigenmann (1888), Miranda-Ribeiro (1918), Fowler (1928) and Chandy (1953) as emphasized by Wheeler & Baddokwaya (1981). Follow-

ing Mo (1991) and de Pinna (1993), *Ancharius* is not considered a member of the Ariidae. It belongs in its own family Anchariidae (Ng & Sparks, 2005).

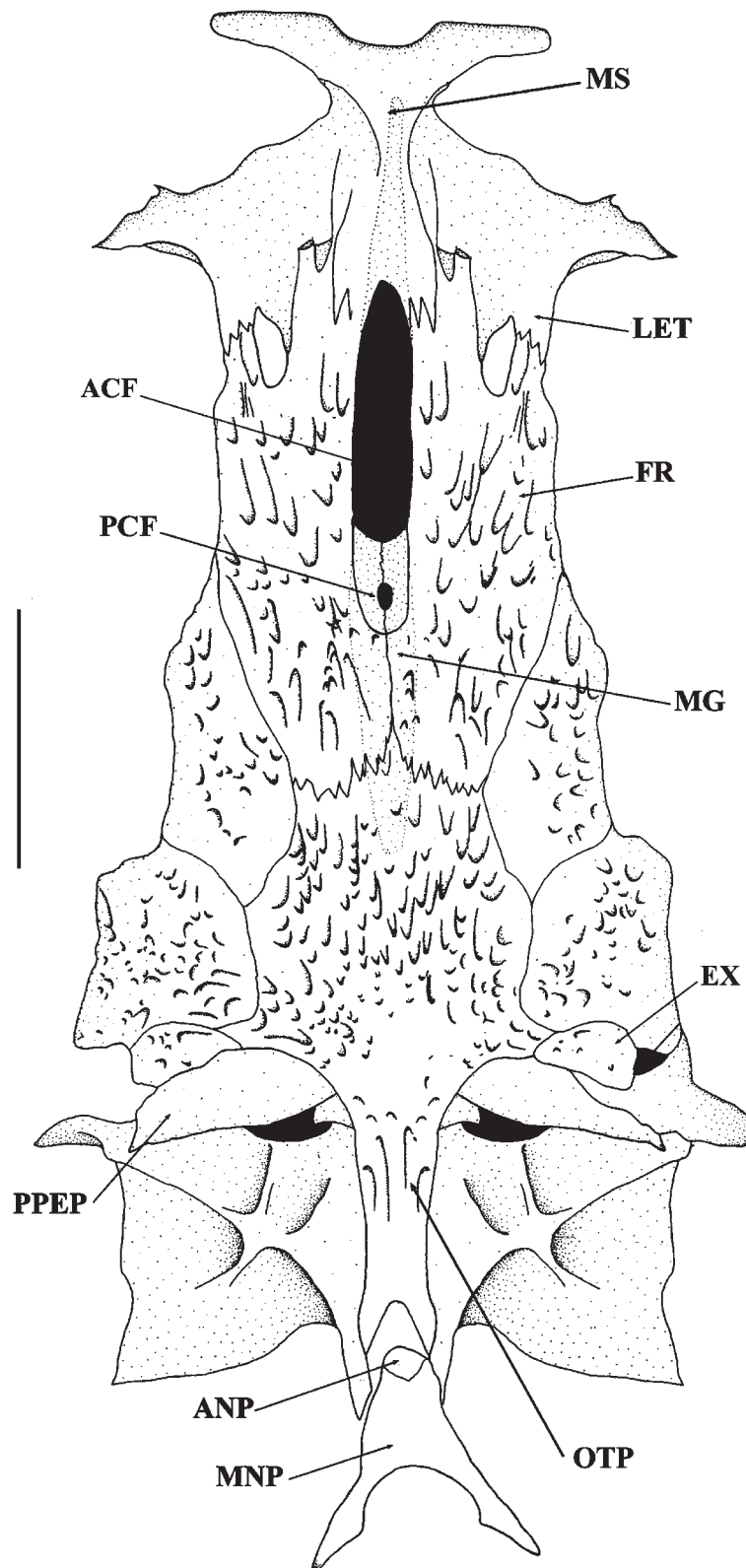


FIGURE 1. *Galeichthys feliceps*, MZUSP 87694. Dorsal view of neurocranium. Scale bar = 10 mm. **ACF** — anterior cranial fontanel; **ANP** — anterior nuchal plate; **EX** — extrascapular; **FR** — frontal; **LET** — lateral ethmoid; **MG** — medial groove of neurocranium; **MNP** — median nuchal plate; **MS** — mesethmoid; **OTP** — occipital process; **PCF** — posterior cranial fontanel; **PPEP** — posterior process of epioccipital.

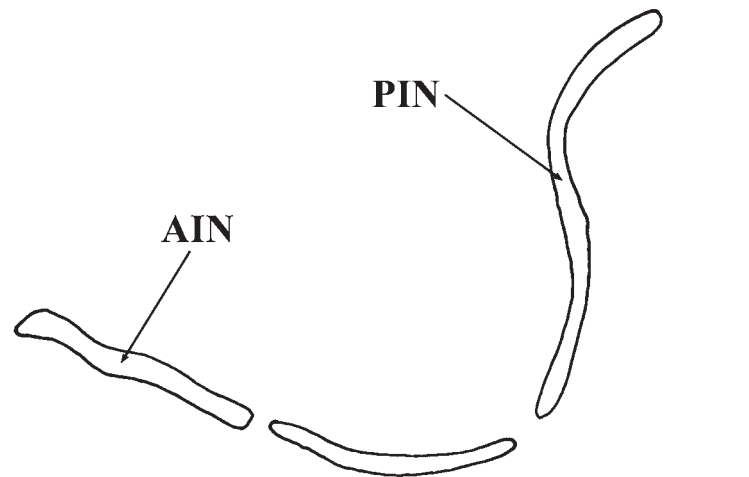


FIGURE 2. *Galeichthys feliceps*, MZUSP 87694. Lateral view of infraorbital series. Scale bar = 4 mm. **AIN** — anterior infraorbital; **PIN** — posterior infraorbital.

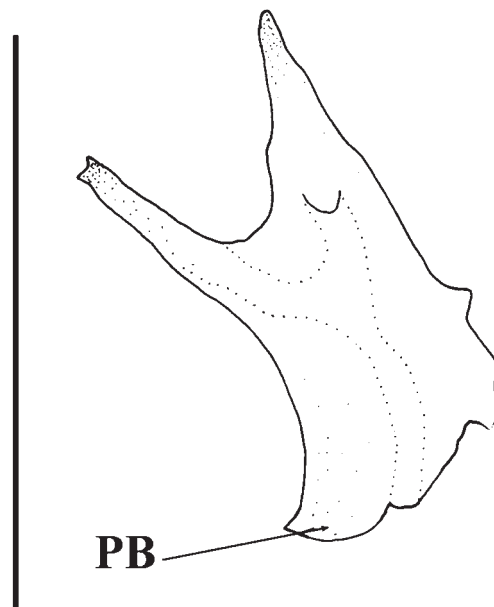


FIGURE 3. *Galeichthys ater*, MZUSP 87693. Dorsal view of lachrymal. Scale bar = 4 mm. **PB** — posterior branch.

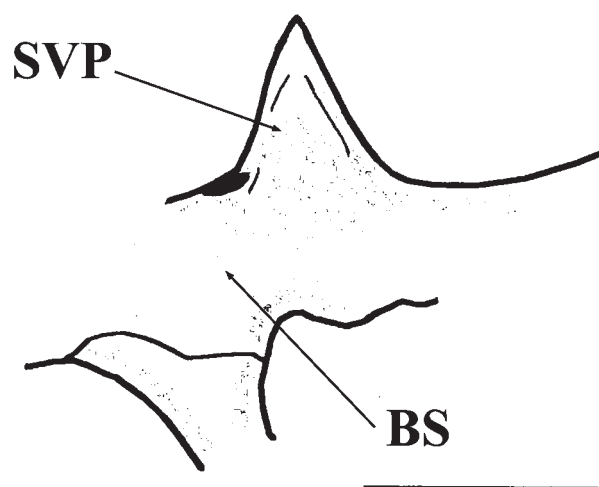


FIGURE 4. *Aspistor luniscutis*, MZUSP 51689. Ventral view of subvertebral process. Scale bar = 4 mm. **BS** — basioccipital; **SVP** — subvertebral process.

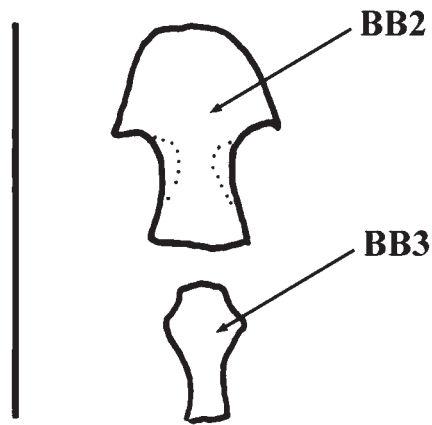


FIGURE 5. *Netuma thalassinus*, UMMZ 214630. Dorsal view of second and third basibranchials. Scale bar = 4 mm. **BB2** — second basibranchial; **BB 3** — third basibranchial.

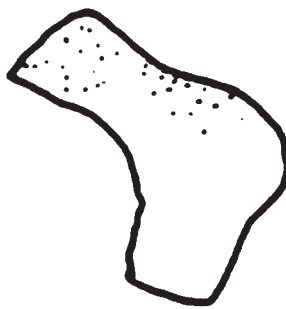


FIGURE 6. *Genidens barbatus*, MZUSP 24524. Dorsal view of third pharyngobranchial. Scale bar = 4 mm.

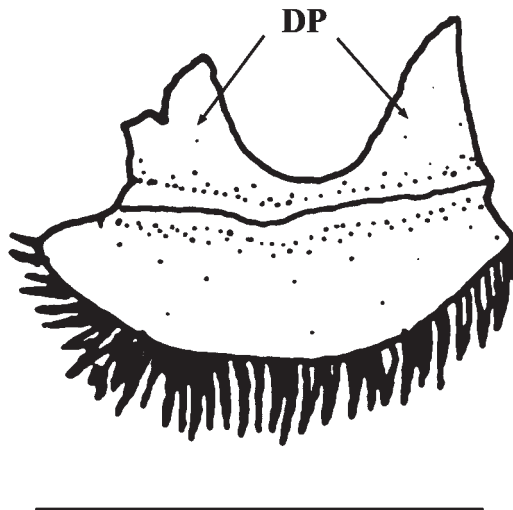


FIGURE 7. *Genidens barbatus*, MZUSP 24524. Lateral view of pharyngeal tooth plate. Scale bar = 4 mm. **DP** — dorsal process.

Amissidens Kailola, 2004

Amissidens Kailola, 2004: 125. Type species: *Arius hainesi* Kailola, 2000. Type by original designation. Gender: masculine

Diagnosis. The following diagnostic characters are quoted from Kailola (2004). “Toothless palate, deeply

excavated and elongate dorsomedian fontanel, two large epithelial flaps on the palate posterior and double folds of epithelial tissue on the upper limb of the first two gill arches, and rakers present along the back of all gill arches. Pads on the pelvic fins of mature females are scalloped and tapered and the gonads in females are united along their proximal third. The metapterygoid is enlarged and ends well past the hind border of the quadrate, and the fin spines are thin, long and slender. The frontal-lateral ethmoid space is large and the lateral ethmoid is prominent. The palatine are long, the jaws are thin, and the premaxillaries short with truncate lateral margin. The laminar bone over the anterior vertebrae is extensive, and the Mullerian ramus is long. The triangular supraoccipital process has a prominent median keel. The short posterior cleithral process is heavily ossified anteroventrally. The jaw teeth are slender, in a short, oblong band, the lips are fleshy and thin and the mouth is small and almost quadrangular, all of the premaxillary tooth band is visible when the mouth is closed. A shallow groove is usually present on the snout between the posterior nostrils. The barbels are thin and wisp-like distally, the longest reaching only past the eye, the bases of the chin barbels are close together and aligned transversely. The eye is large. The gill openings are somewhat restricted and there are many gill rakers. The adipose fin is short-base and situated posteriorly. The lateral line turns dorsal at the tail base. The branchial chamber and sometimes the hind part of the mouth often are colored dark brown or purplish charcoal. Seven to ten longitudinal ridges or furrows develop in the skin of the nape and upper sides with growth.”

Remarks. The type-species of the genus recently described by Kailola (2000b) is rare in museum collections and could not be obtained for study.

Distribution and habitat. Southern New Guinea and northern Australia, marine and brackish waters.

Amissidens hainesi (Kailola, 2000)

Arius hainesi Kailola, 2000: 139, figs. 9–11. Type locality: Ludmilla Creek, 12°27'S, 130°46'E, Darwin, Northern Territory, Australia. Holotype: NTM S.11507-001. Paratypes: AMS I.25995-0012, I.25996-001, I.27414-001; CSIRO C.3799, H.4545-01, H.4937-03, H.5252-01, NTM S. 10190-002, QM I.22657, USNM 288553.

Distribution: Southern New Guinea and northern Australia.

Countries: Papua New Guinea and Australia.

Habitat: Marine and brackish waters.

Maximum size: 302 mm SL.

Amphiarius new genus

(fig. 8)

Type species: *Arius rugispinis* Valenciennes in Cuvier & Valenciennes, 1840b.

Diagnosis. Distinguished from the remaining ariid genera by the following exclusive (1) and shared (2) characters: (1) accessory tooth plates small to moderate roughly round and laterally located; (2) bony bridge formed by frontals and lateral ethmoid having frontals as its major component (shared with *Cathorops*, *Cephalocassis* and *Hemiaris*).

Supplementary morphological characters. Cephalic shield granulated visible under the skin; a moderately developed fenestra limited by frontal and lateral ethmoid bones clearly visible under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital absent; posterior cranial fontanel oval, clearly differentiated; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital invading or not into dorsal portion of cephalic shield; occipital process funnel shaped long, its posterior part considerably narrower than its base;

anterior and median nuchal plates fused, indistinct forming a structure of semi-lunar aspect; vomerine tooth plates absent; accessory tooth plates round to oval shaped, with acicular teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very long, as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide, with a second dorsal process on its upper portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

Remarks. *Amphiarius phrygiatus* and *A. rugispinis* were considered by Marceniuk (2003) as belonging to a monophyletic genus not formally described at that time, and Kailola (2004) suggested that the two species could represent a new genus. The two species were previously included in *Arius* by Taylor & Menezes (1977), Burgess (1989), Cervigón (1992), Le Bail *et al.* (2000), Camargo & Isaac (2001), Acero (2003), Marceniuk & Ferraris (2003), and in *Notarius* by Betancur & Acero (2004), but can be separated out from the former by the absence of medial groove on the cranium, lateral line not bifurcated at caudal region, reaching caudal-fin upper lobe and base of adipose fin as long as anal-fin base and from the latter by the absence of teeth associated with vomer and occipital process funnel shaped, long, its posterior part considerably narrower than its base (see also diagnosis of the genus).

Distribution and Habitat. North and eastern South America, marine, brackish and fresh waters.

Etymology. The first part of the generic name *amphi* is from Greek meaning on both sides, double, with reference to the occurrence of the included species both in fresh and marine waters. The second part is from the frequently used ariid generic name *arius*. Gender: masculine.



FIGURE 8. *Amphiarius rugispinis*, MZUSP 25170, 195 mm TL. Lateral view.

Amphiarius phrygiatus (Valenciennes, 1840)

Arius phrygiatus Valenciennes in Cuvier & Valenciennes, 1840b: 79. Type locality: Surinam. Holotype: RMNH 3308.

Distribution: North and eastern South America.

Countries: Venezuela, Guyana, Surinam, French Guiana and Brazil.

Habitat: brackish and fresh waters.

Maximum size: 300 mm TL.

Material examined: USNM 233474 (4 al, 219–338 mm TL) (1 c&s), Venezuela, terr. fed. delta Amacuro, Orinoco River, deep river channel, brazo imataca near Curiapo, 60 naut. mi. upstream from sea buoy.

Amphiarius rugispinis (Valenciennes, 1840)

(fig. 8)

Arius rugispinis Valenciennes in Cuvier & Valenciennes, 1840b: 77. Type locality: Cayenne, French Guiana. Syntypes: MNHN A-9403.

Tachysurus atroplumbeus Fowler, 1931: 394, fig. 2. Type locality: Vessigny Beach, Brighton, Trinidad Island, West Indies. Holotype: ANSP 53316.

Distribution: North and Eastern South America.

Countries: Trinidad Island, Guyana, Surinam, French Guiana and Brazil.

Habitat: Marine and brackish waters.

Maximum size: 450 mm TL.

Material examined: FMNH 52852 (4 al, 292–410 mm TL), Guyana, Georgetown market; MZUSP 87695 (1 c&s), Brazil, Maranhão, ilha de São Luís, estreito de Coqueiro; MZUSP 25170 (1 al), Brazil, Pará, Vigia.

***Arius Valenciennes*, 1840**

(fig. 9)

Arius Valenciennes in Cuvier & Valenciennes, 1840b: 53. Type species: *Pimelodus arius* Hamilton, 1822. Type by absolute tautonymy. Gender: masculine.

?*Ariodes* Müller & Troschel, 1849: 9. Type species: *Bagrus (Ariodes) arenarius* Müller & Troschel, 1849. Type by subsequent designation. Type designated by Bleeker (1962: 8; 1863: 91) (subgenus of *Bagrus*). Gender: masculine.

Pseudarius Bleeker, 1862: 8. Type species: *Pimelodus arius* Hamilton, 1822. Type by original designation. Gender: masculine.

Diagnosis. *Arius* species can be distinguished from all other ariid genera by the following combination of non-exclusive characters: (1) frontal bones without laminar mesial projection (shared with *Amphiarius*, *Aspistor*, *Cathorops*, *Cephalocassis*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Osteogeneiosus*, *Potamarius* and *Potamosilurus latirostris*); (2) orbitosphenoid lateral projections moderately long, its lateral edge irregularly shaped (shared with *Carlarius parkii*); (3) mesopterygoid subtriangular and very long [shared with *Amphiarius rugispinis*, *Bagre* (with exception of *B. panamensis*), *Cathorops*, *Cephalocassis*, *Cinetodus*, *Cryptarius*, *Doiichthys*, *Genidens*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Pachyula*, *Potamarius*, *Sciades assimilis*, *S. leptaspis*, *S. guatemalensis*, *S. platypogon*, *S. sagor* and *S. seemanni*]; (4) third basibranchial cup shaped its anterior portion very wide, posterior portion elongated [shared with *Amphiarius*, *Aspistor*, *Batrachcephalus*, *Cephalocassis borneensis*, *Cinetodus*, *Cryptarius*, *Hemiaris stormii*, *Netuma*, *Pachyula*, *Plicofollis* (with exception of *P. platystomus* and *P. tenuispinis*) and *Sciades* (with exception of *S. bonillai*, *S. guatemalensis*, *S. proops*, *S. passany* and *S. sagor*)].

Supplementary morphological characters. Cephalic shield granulated visible under the skin; fenestra of moderate size limited by frontal and lateral ethmoid bones visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel moderately large, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic bones absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading into dorsal portion of cephalic shield; occipital process triangular, moderately long and wide, progressively narrower toward its posterior part; anterior and median nuchal plates fused, indistinct forming a structure of semi-lunar aspect; vomerine tooth plates absent; accessory tooth plates present, oval shaped or longitudinally elongated, bearing conical or molar-like teeth; maxillary barbel fleshy, cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half length of anal-fin base; lateral line bifurcated at caudal region, reaching base of caudal-fin upper and lower lobes; cleithrum wide, with a second dorsal process on its upper portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

Remarks. The limits and the monophyletic condition of *Arius* have always been one of the great challenges in ariid systematics. The genus was never properly defined and included most of the species currently considered to belong in different valid genera. The difficulties in the identification and composition of *Arius* have been recently emphasized by Kailola (1999) and Acero (2003) who recognized it as a non-monophyletic

group. Two groups of species are herein distinguished: with accessory tooth plates very elongated bearing molar-like teeth (group one) and with accessory tooth plates oval shaped or subtriangular bearing acicular or conic teeth (group two). They are not named and the phylogenetic relationships within *Arius* will be fully discussed in another paper.

Although not examined, *A. jella* Day, 1877, *A. malabaricus* Day, 1877 and *A. microcephalus* Bleeker, 1855 are considered to belong in *Arius* (group one) based on presence of certain external morphological features described in the literature. The same is true for *A. acutirostris* (Day, 1877), *A. africanus* Günther, 1867, *A. brunellii* Zollezi, 1939, *A. burmanicus* Day, 1870, *A. festinus* Ng & Sparks, 2003, *A. leptonotacanthus* Bleeker, 1849, *A. macronotacanthus* Bleeker, 1846, *A. nenga* (Hamilton, 1822), *A. oetik* Bleeker, 1846, *A. subrostratus* Valenciennes, 1840, *A. uncinatus* Ng & Sparks, 2003, *A. venosus* Valenciennes, 1840 (group two). *A. jatius* (Hamilton, 1822) was not examined and although not having accessory tooth plates it was included in the genus based on the moderate size of its adipose fin and the lateral line bifurcated at the caudal region. As the other species of *Arius* its distribution is restricted to the Indian Ocean. No specimen of *Bagrus arenarius* Müller & Troschel, 1849 could be obtained for examination and descriptions available in the literature do not allow the recognition of the species as a member of *Arius*. Thus, the inclusion of *A. arenarius* in the genus is preliminary and based only on Kailola's (2004) results. The recognition of *Arenarius* as junior synonym of *Arius* is tentative and needs confirmation.

Distribution and Habitat. Eastern Africa and south to southeast Asia, brackish and fresh waters.



FIGURE 9. *Arius arius*, LACM 38129-95, 139 mm TL. Lateral view.

***Arius acutirostris* Day, 1877**

Arius acutirostris Day, 1877: 459, pl. 107 (fig. 1). Type locality: Salwein River at Moulmein, Myanmar. Syntypes: BMNH 1870.6.14.34; NMW 44358, 48327; ZMB 2735, F454, F500, A569.

Distribution: South and southeast Asia.

Countries: Myanmar.

Habitat: Mostly in brackish waters.

Maximum size: 305 mm TL.

***Arius africanus* Günther, 1867**

Arius falcarius africana var. Günther in Playfair & Günther, 1867: 114. Type locality: Pangani River, Tanzania. Syntypes: BMNH 1865.9.21.16, 1867.3.7.385–386, 1867.3.9.499.

Distribution: Eastern Africa.
Countries: Tanzania.
Habitat: Fresh and brackish waters.

***Arius arenarius* (Müller & Troschel, 1849)**

Bagrus (Ariodes) arenarius Müller & Troschel, 1849: 9. Type locality: China. Syntypes: ZMB 3001.
Arius fangi Chaux in Chaux & Fang, 1949: 194, fig. 1. Type locality: Tonkin, Vietnam. Holotype (unique): MNHN 1966-0726.

Distribution: Southeast Asia.
Countries: Vietnam and China.
Habitat: Marine and brackish waters.
Maximum size: 290 mm TL.

***Arius arius* (Hamilton, 1822)**

(fig. 9)

Pimelodus arius Hamilton, 1822: 170, 376. Type locality: Bengal estuaries. No types known.
Arius falcarius Richardson, 1845: 134, pl. 62 (figs. 7–9). Type locality: Canton, China. Syntypes: BMNH (apparently lost).
Bagrus crinalis Richardson, 1846: 282. Type locality: Canton, China. No types known.
Pimelodus mong Richardson, 1846: 286. Type locality: Canton, China. No types known.
Arius cochinchinensis Günther, 1864: 170. Type locality: Cochinchine. Holotype: BMNH (not seen).
Arius boakeii Turner, 1867: 82. Type locality: Sri Lanka. Syntypes: BMNH 1866.7.11.1, NMSZ 1987.030.
Arius buchanani Day, 1877: 463, pl. 105 (fig. 6). Type locality: Hooghly channel, Calcutta, India; Irrawaddy, Myanmar. Syntypes: ZSI 456, 1302 (1 lost).

Distribution: South and southeast Asia.
Countries: Pakistan, India, Sri Lanka, Bangladesh, Thailand, Indonesia, Singapore and China.
Habitat: Predominantly brackish waters.
Maximum size: 340 mm TL.

Material examined: ANSP 60717 (1 al, 150 mm TL), Thailand, Bangkok, Siam; ANSP 106800 (4 al, 41–190 mm SL), Baram, north Borneo, Indonesia; CAS 131523 (4 al, 87–108 mm TL) (1 c&s), India, Karalla state, Kozhikode, Calicut, research station; LACM 38129-95 (3 al, 126–142 mm TL) (1 c&s), Pakistan, Sind, WNW of mouth of Korangi.

***Arius brunellii* Zollezi, 1939**

Arius brunellii Zollezi, 1939: 168, fig. 1. Type locality: Juba River, Somalia. Syntypes: whereabouts unknown

Distribution: Eastern Africa.
Countries: Somalia.
Habitat: Freshwaters.

***Arius burmanicus* Day, 1870**

Arius burmanicus Day, 1870: 618. Type locality: Irrawady River, Bassein district, Salween, Tenasserim provinces, Myanmar. Syntypes: AMS B.7520, BMNH 1870.5 [or 6].14.43–44, RMNH 8787, ZMB 2754, ZSI 456, A.568, B292.

Distribution: South and southeast Asia.

Countries: India, Bangladesh and Myanmar.

Habitat: Primarily in freshwater.

Maximum size: 240 mm SL.

***Arius caelatus* Valenciennes, 1840**

Arius caelatus Valenciennes in Cuvier & Valenciennes, 1840b: 66. Type locality: Jakarta, Java, Indonesia; Bombay, India. Syntypes: MNHN B-589, Java; MNHN B-614, Bombay.

Arius caelatooides Bleeker, 1846: 159. Type locality: Jakarta, Java, Indonesia.

Distribution: South and southeast Asia.

Countries: Pakistan, India, Sri Lanka, Bangladesh, Myanmar, Thailand, Malaysia, Cambodia and Indonesia.

Habitat: Marine and brackish waters.

Maximum size: 450 mm TL.

Material examined: ANSP 60690 (5 al, 81–130 mm TL) (1 c&s), Thailand, Bangkok, Siam; CAS 63619 (5 al, 144–285 mm TL), Thailand, gulf of Thailand, fishing grounds off Chon Buri City, from Chon Buri market; FMNH 23373 (2 al, 190–206 mm TL), Malaysia, Sabah, Sandakan; LACM 38132-64 (3 al, 125–154 mm TL) (1 c&s), Pakistan, Sind, mouth of Turshian Creek, 4 km Sul, near mouth of Khobar Creek; UMMZ 208844 (3 al, 141–227 mm TL) (1 c&s), Bangladesh, Chittagong, bay of Bengal, just off Kutubdia Island.

***Arius dispar* Herre, 1926**

Arius dispar Herre, 1926: 405, pl. 1 (fig. 54). Type locality: Paco market, Manila, Philippines. Holotype: BSMP, presumed destroyed. Paratypes: BSMP, presumed destroyed.

Distribution: South and southeast Asia.

Countries: Philippines and China.

Habitat: Predominantly brackish waters.

Maximum size: 340 mm TL.

Material examined: CAS 127666 (8 al) (1 c&s), Philippines, Rizal Laguna, Luzon I., Laguna de Bay.

***Arius festinus* Ng & Sparks, 2003**

Arius festinus Ng & Sparks, 2003: 5, fig. 4. Type locality: Amboabo River near its confluence with the Mangarahara River (left bank trib. of the Sofia River), 15°50'01"S, 48°42'52"E, Madagascar. Holotype: UMMZ 239806. Paratypes: AMNH 211457.

Distribution: Western Madagascar.

Countries: Madagascar.

Habitat: freshwater.

***Arius gagora* (Hamilton, 1822)**

Pimelodus gagora Hamilton, 1822: 167, 376, pl. 10 (fig. 54). Type locality: Bengal estuaries. No types known.

Arius macracanthus Günther, 1864: 167. Type locality: Thailand. Holotype: BMNH 1862.11.222.

Distribution: South and southeast Asia.

Countries: India, Bangladesh, Myanmar and Thailand.

Habitat: Brackish and freshwaters.

Maximum size: 1.000 mm TL.

Material examined: UMMZ 187892 (4 al, 147–175 mm TL) (1 c&s), Bangladesh, Comilla, Meghna River, Chandpu.

***Arius jatius* (Hamilton, 1822)**

Pimelodus jatius Hamilton, 1822: 171, 376. Type locality: Bengal. No types known.

Distribution: South and southeast Asia.

Countries: India, Sri Lanka and Bangladesh.

Habitat: Brackish and fresh waters.

Maximum size: 305 mm TL.

***Arius jella* Day, 1877**

Arius jella Day, 1877: 467, pl. 106 (fig. 3). Type locality: Madras, Coromandel coast, India. Syntypes: ZSI 1304.

Distribution: South and southeast Asia.

Countries: India, Sri Lanka and Thailand.

Habitat: Marine and brackish waters.

Maximum size: 310 mm TL.

Material examined: ANSP 60717 (1 al, 160 mm TL), Thailand, Bangkok; CAS 141039 (4 al, 187–208 mm TL), India, Karalla state, Kozhikode.

***Arius leptotacanthus* Bleeker, 1849**

Arius leptotacanthus Bleeker, 1849: 11. Type locality: Madura Straits near Surabaya and Kammal, Java, Indonesia.

Syntypes: BMNH 1863.12.4.144, Madura.

Distribution: Southeast Asia.

Countries: Thailand and Indonesia.

Habitat: Marine and brackish waters.

Maximum size: 250 mm SL.

Arius macronotacanthus Bleeker, 1846

Arius macronotacanthus Bleeker, 1846: 159. Type locality: Jakarta, Java, Indonesia. Holotype: RMNH 6901.

Arius parvipinnis Day, 1877: 460, pl. 113 (fig. 1). Type locality: Coromandel coast of India. No types known.

Distribution: South and southeast Asia.

Countries: India, Singapore, Thailand, Malaysia and Indonesia.

Habitat: Predominantly brackish waters.

Maximum size: 300 mm TL.

***Arius maculatus* (Thunberg, 1792)**

Silurus maculatus Thunberg, 1792: 31, pl. 1 (fig. 2). Type locality: China; Japan. No types known.

Pimelodus thunberg Lacépède, 1803: 691, 692. Type locality: China; Japan.

Arius gagoroides Bleeker, 1846: 168. Type locality: locality not stated. Type locality: Syntypes: SMNS 10567.

Arius heckelii Bleeker, 1846: 169. Type locality: Jakarta, Java, Indonesia.

Arius pidada Bleeker, 1846: 169 (in part). Type locality: Jakarta, Java, Indonesia. Syntypes: AMSB. 7965, BMNH 1863.12.4.57, NMV 45948.

Arius angulatus Bleeker, 1846: 170. Type locality: Jakarta, Java, Indonesia.

Arius viviparus Bleeker, 1846: 171. Type locality: Jakarta, Java, Indonesia. No types known.

Arius borneensis Bleeker, 1851: 67. Type locality: Bandjarmasin, Borneo, Indonesia. No types known.

Hemipimelodus bicolor Fowler, 1935: 100, fig. 23. Type locality: Bangkok, Thailand. Holotype: ANSP 67906.

Hemipimelodus atripinnis Fowler, 1937: 145, fig. 34. Type locality: Bangkok, Thailand. Holotype: ANSP 67906.

Distribution: South and southeast Asia.

Countries: Sri Lanka, Thailand, Indonesia, Philippines and China.

Habitat: Marine and brackish waters.

Maximum size: 600 mm TL.

Material examined: USNM 297128 (5 al, 165–175 mm TL) (1 c&s), Sri Lanka, eastern province, Batticaloa dist., Batticaloa, tidal lagoon opposite government rest house.

***Arius madagascariensis* Vaillant, 1894**

Arius madagascariensis Vaillant, 1894: 77. Type locality: Urundava River, west Madagascar. Holotype: MNHN 1894-0002.

Distribution: Western Madagascar.

Countries: Madagascar.

Habitat: Fresh and brackish waters.

Material examined: AMNH 88075 (4 al, 213–400 mm TL) (1 c&s), Malagasy Republic, Madagascar, Antsirabe market, from Tsiribihina River.

***Arius malabaricus* Day, 1877**

Arius malabaricus Day, 1877: 464, pl. 107 (fig. 4). Type locality: Canara, India. Holotype: ZSI 1305.

Distribution: Southern Asia.

Countries: India.

Habitat: Marine and brackish waters.

***Arius manillensis* Valenciennes, 1840**

Arius manillensis Valenciennes in Cuvier & Valenciennes, 1840b: 93. Type locality: Manila, Philippines. Holotype: MNHN.

Pseudarius philippinus Sauvage, 1880: 226. Type locality: lake Laglaize, Luzon I., Philippines.

Distribution: Southeast Asia.

Countries: Philippines.

Habitat: Brackish and fresh waters.

Maximum size: 350 mm TL.

Material examined: CAS 138201 (15 al, 102–170 mm TL) (1 c&s), Philippines, Rizal prov. Luzon I. Tagig; USNM 138384 (2 al, 150–223 mm TL), Philippine, San Rogue mkt., Cavite.

***Arius microcephalus* Bleeker, 1855**

Arius microcephalus Bleeker, 1855: 423. Type locality: Bandjarmasin, Borneo, Indonesia. Syntypes: BMNH 1863.12.11.149; RMNH 6902 (1).

Arius sciurus Smith, 1931: 30. Type locality Ta Pi R near Surat Thani, Malay Peninsula, Thailand.

Distribution: South and southeast Asia.

Countries: Thailand, Malaysia and Indonesia (Borneo).

Habitat: Marine and brackish waters.

Maximum size: 600 mm TL.

***Arius nenga* (Hamilton, 1822)**

Pimelodus nenga Hamilton, 1822: 171, 376. Type locality: Ganges River, India. No types known.

Arius aequibarbis Valenciennes in Cuvier & Valenciennes, 1840b: 68. Type locality: Rangoon, Myanmar; Bengal. Syntypes: MNHN 1200, Bengal; MNHN B-0682, Rangoon.

Arius granosus Valenciennes in Cuvier & Valenciennes, 1840b: 69. Type locality: Pondicherry, India. Holotype: MNHN B-0681.

Arius clypeaster Bleeker, 1846: 161. Type locality: Jakarta, Java, Indonesia. No types known.

Arius microgastropterygius Bleeker, 1846: 160. Type locality: Jakarta, Java, Indonesia.

Arius clypeastroides Bleeker, 1846: 161. Type Locality: Jakarta, Java, Indonesia. No types known.

Arius melanopterygius Bleeker, 1849: 10. Type Locality: Madura Straits near Surabaya and Kammal, Java, Indonesia.

Distribution: South and southeast Asia.

Countries: India, Thailand, Myanmar, Malaysia and Indonesia.

Habitat: Marine and brackish waters.

Maximum size: 300 mm TL.

***Arius oetik* Bleeker, 1846**

Arius oetik Bleeker, 1846: 166. Type locality: unknown. Syntypes: BMNH 1863.12.4.111.

Arius pidada Bleeker, 1846: 169. Type locality: Jakarta, Java, Indonesia. (in part)

Distribution: South and southeast Asia.

Countries: Thailand, Malaysia and Indonesia (Sumatra and Java).

Habitat: Marine and brackish waters.

Maximum size: 300 mm TL.

***Arius subrostratus* Valenciennes, 1840**

Arius subrostratus Valenciennes in Cuvier & Valenciennes, 1840b: 62. Type locality: Malabar, India. Holotype: MNHN 1190.

Distribution: South and southeast Asia.

Countries: Pakistan, India, Sri Lanka, Thailand, Singapore, Indonesia and Philippines.

Habitat: Marine and brackish waters.

Maximum size: 320 mm TL.

Material examined: USNM 297119 (2 al, 271–300 mm TL), Sri Lanka, Negombo, Ceylon.

***Arius uncinatus* Ng & Sparks, 2003**

Arius uncinatus Ng & Sparks, 2003: 12, fig. 7. Type locality: Lake Andrapongy near Antsohihi, Madagascar. Holotype: MHNG 2622.81. Paratypes: AMNH 211458, MHNG 2537.66, UMMZ 238058.

Distribution: Lake Andrapongy, Madagascar

Countries: Madagascar

Habitat: Freshwater.

***Arius venosus* Valenciennes, 1840**

Arius venosus Valenciennes in Cuvier & Valenciennes, 1840b: 69. Type locality: Rangoon, Myanmar; Manila, Philippines. Syntypes: MNHN 1205.

Arius micronotacanthus Bleeker, 1846: 162. Type locality: Jakarta, Java, Indonesia.

Arius manjong Bleeker, 1846: 164. Type locality: Jakarta, Java, Indonesia.

Arius macruropterygius Bleeker, 1846: 164. Type locality: Jakarta, Java, Indonesia.

Arius laeviceps Bleeker, 1846: 165. Type locality: Jakarta, Java, Indonesia.

Arius micruropterygius Bleeker, 1847: 165. Type locality: Jakarta, Java, Indonesia.

Distribution: South and southeast Asia.

Countries: India, Myanmar, Thailand, Singapore, Malaysia, Indonesia and Philippines.

Habitat: Marine and brackish waters.

Maximum size: 320 mm TL.

Species inquirendae

Arius argenteus Lütken, (ex Krøyer) 1874: 211. Type locality: Canton, China. Holotype: ZUMC 485.

Silurus ascita Linnaeus, 1758: 306. Type locality: India. Syntypes: NRM LP.

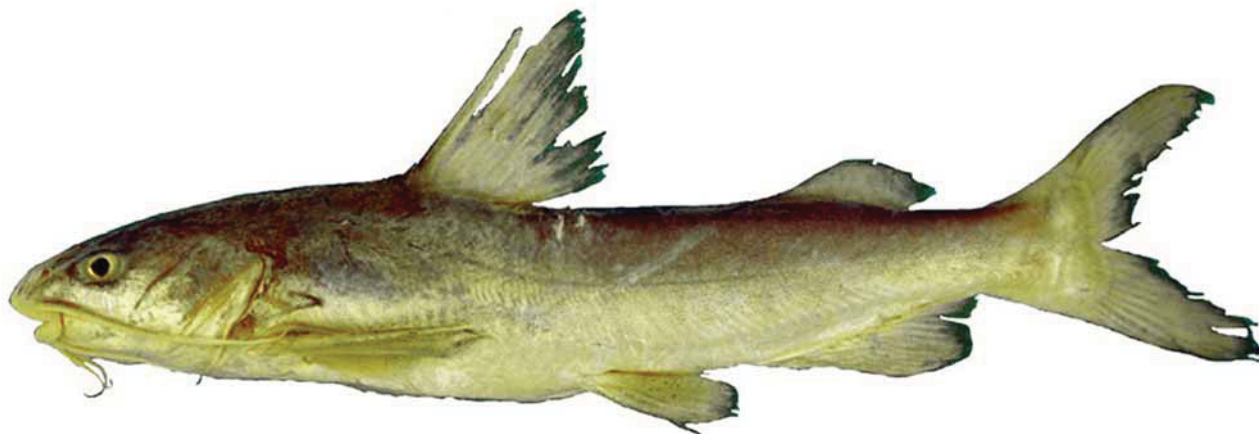


FIGURE 10. *Aspistor luniscutis*, MZUSP 61342, 163 mm TL. Lateral view.

***Aspistor* Jordan & Evermann, 1898**
(fig. 10)

Aspistor Jordan & Evermann, 1898: 2763. Type species: *Arius luniscutis* Valenciennes, 1840. Type by original designation. Gender: masculine.

Diagnosis. *Aspistor* can be diagnosed by the following combination of exclusive (1 to 4) and shared characters (5 to 13): (1) tooth plates associated with vomer usually fused as a single large plate, indistinct in adult specimens; (2) bony blade associated with urohyal medial process approximately of same width for its entire length (fig. 11); (3) anterior and median nuchal plates forming a well developed butterfly shaped structure (fig. 12); (4) anterior margin of nuchal plate slightly concave (fig. 12); (5) lateral processes of vomer very wide (shared with *Arius*, *Bagre*, *Batrachocephalus*, *Cinetodus*, *Galeichthys*, *Nemapteryx*, *Notarius planiceps*, *Osteogeneiosus*, *Pachyula*, *Plicofollis tenuispinis*, *Plicofollis platystomus*, *Potamosilurus* and *Sciades*); (6) accessory tooth plates longitudinally elongate, anteriorly wide and becoming progressively narrower toward its posterior part [shared with *Arius* (with exception of *A. caelatus*, *A. dispar* and *A. madagascariensis*), *Osteogeneiosus* and *Plicofollis*]; (7) accessory tooth plates ventral to orbitosphenoid and metapterygoid [shared with *Arius* (with exception of *A. caelatus* and *A. madagascariensis*), *Osteogeneiosus* and *Plicofollis*]; (8) accessory tooth plates bearing molariform teeth [shared with *Arius* (with exception of *A. caelatus* and *A. madagascariensis*), *Batrachocephalus*, *Cathorops* (with exception of *C. dasycephalus*), *Osteogeneiosus* and *Plicofollis*]; (9) epioccipital dorsally exposed (fig. 12) [shared with *Amphiarius rugispinis*, *Carlarius*, *Cinetodus*, *Pachyula* and *Plicofollis* (with exception of *P. platystomus* and *P. tenuispinis*)]; (10) posterior margin of occipital process convex (fig. 12) (shared with *Sciades proops*); (11) nuchal plate overlaying occipital process (shared with *Notarius troschelii*, *Sciades emphysetus* and *S. proops*); (12) lateral processes of urohyal, half as long medial process (fig. 11) (shared with *Arius*, *Batrachocephalus*, *Cathorops*, *Cephalocassis borneensis*, *Cinetodus*, *Genidens*, *Ketengus*, *Osteogeneiosus*, *Nedystoma*, *Nemapteryx*, *Netuma thalassinus* and *Pachyula*); (13) posterior portion of second basibranchial very short and robust (fig. 13) (shared with *Arius gagora*, *A. maculatus* and *Plicofollis*).

Supplementary morphological characters. Cephalic shield granulated visible under the skin; a moderately developed fenestra limited by frontal and lateral ethmoid bones visible under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital absent; posterior cranial fontanel oval, clearly differentiated; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital invading into dorsal portion of cephalic shield;

occipital process very short and wide at base, round shaped; anterior and median nuchal plates fused and indistinct, forming a butterfly shaped large structure; vomerine tooth plates absent; accessory tooth plates longitudinally elongated, with molar-like teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very long, as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide, with a second dorsal process on its upper portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

Distribution and habitat. North and eastern South America, marine and brackish waters.

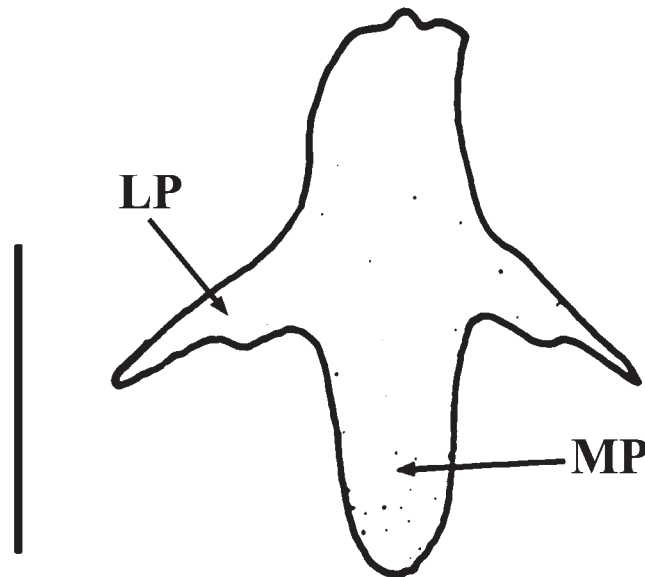


FIGURE 11. *Aspistor luniscutis*, MZUSP 87696. Ventral view of urohyal. Scale bar = 4 mm. **LP** — lateral process; **MP** — medial process.

***Aspistor luniscutis* (Valenciennes, 1840)**

(fig. 10)

Arius luniscutis Valenciennes in Cuvier & Valenciennes, 1840: 109. Type locality: Brazil. Syntypes: MNHN A-8980, B-0595.

Distribution: Eastern South America.

Countries: French Guiana and Brazil.

Habitat: Marine and brackish waters.

Maximum size: 1.200 mm TL.

Material examined: MZUSP 87696 (3 al) (1 c&s), Brazil, coast of São Paulo state; MZUSP 51723 (3 al), Brazil, Bahia, rio Peruípe, port of Viçosa; MZUSP 51689 (3 e), Brazil, Paraná, baía de Paranaguá; MZUSP 51690 (1 es), Brazil, coast of the São Paulo state; MZUSP 61342 (3 al), Brazil, Bahia, Caravelas, estuary and mouth of rio Caravelas.

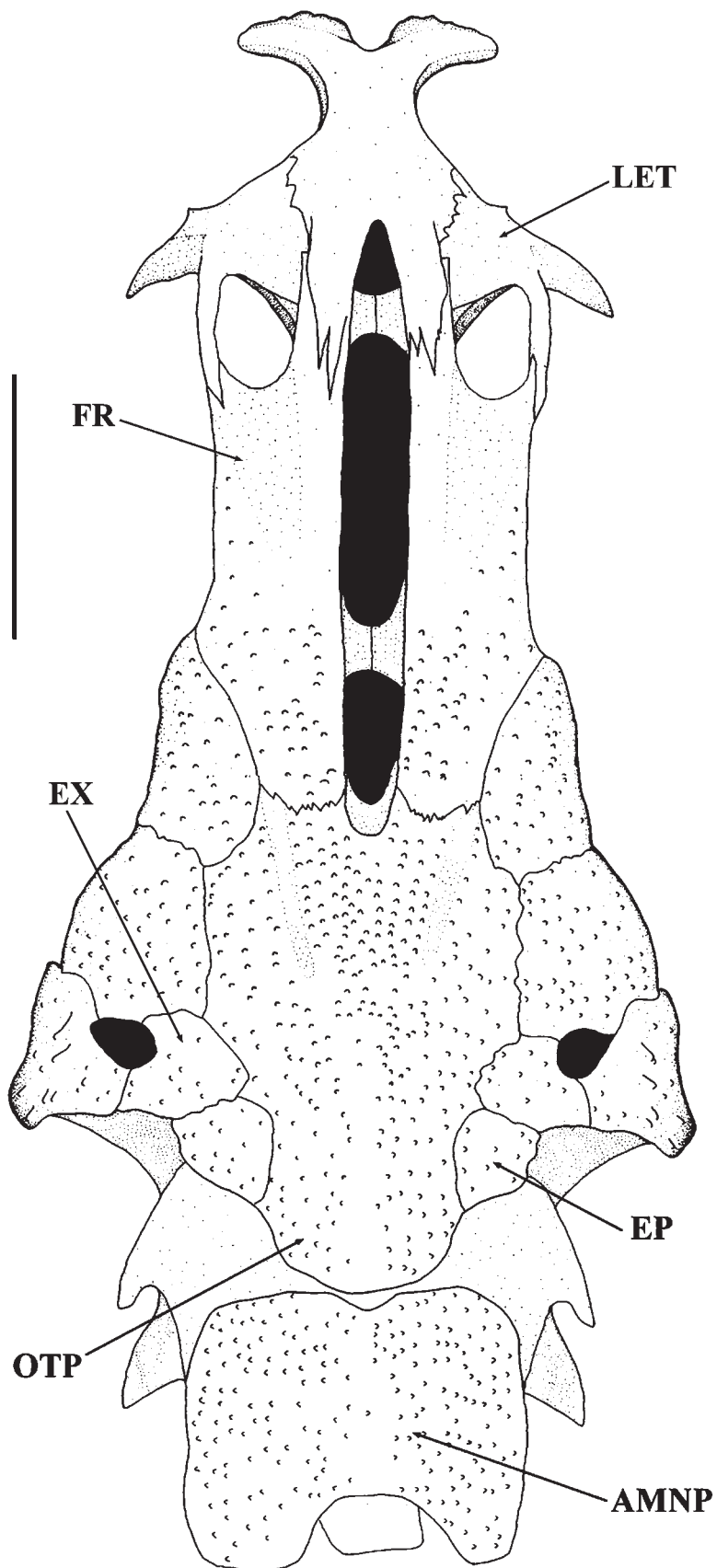


FIGURE 12. *Aspistor luniscutis*, MZUSP 87696. Dorsal view of neurocranium. Scale bar = 10 mm. **AMNP** — anterior and median nuchal plates; **EP** — epioccipital; **EX** — extrascapular; **FR** — frontal; **LET** — lateral ethmoid; **OTP** — occipital process.

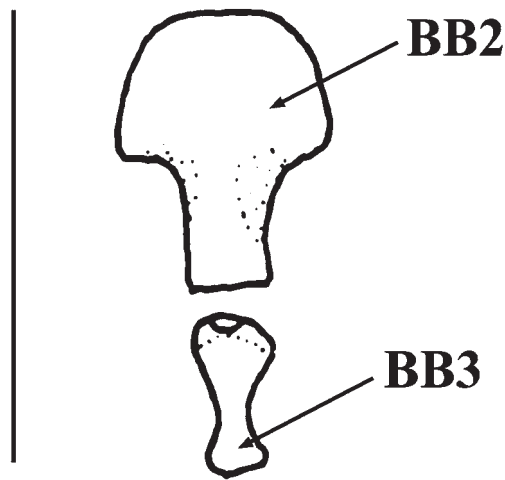


FIGURE 13. *Aspistor luniscutis*, MZUSP 87696. Dorsal view of second and third basibranchials. Scale bar = 4 mm. **BB2** — second basibranchial; **BB 3** — third basibranchial.

Aspistor parkeri (Traill, 1832)

Silurus parkeri Traill, 1832: 380, pl. 6 (fig.1). Type locality: Guiana. Holotype: Unknown.

Arius quadriscutis Valenciennes in Cuvier & Valenciennes, 1840b: 111. Type locality: Surinam. Syntypes: MNHN A-9402, B-0596, B-0613; RMNH 3049, 3050.

Distribution: North Eastern South America.

Countries: Guyana, Surinam, French Guiana and Brazil.

Habitat: Marine and brackish waters.

Maximum size: 500 mm TL.

Material examined: FMNH 52850 (5 al, 282–305 mm TL), Guyana, Georgetown market; MZUSP 87697 (1 c&s), Brazil, Sergipe; MZUSP 87698 (1 c&s), Brazil, Sergipe; MZUSP 52840 (1 al), Brazil, Maranhão, São Luís, ilha de São Luís, rio Curuca.

Bagre Cloquet, 1816

(fig. 14)

Bagre Cloquet, 1816: 52. Type species: *Silurus bagre* Linnaeus, 1766. Type by absolute tautonymy. Gender: masculine.

Bagre Oken, 1817: 1183. Type species: *Silurus bagre* Linnaeus, 1766. Type by absolute tautonymy. Gender: masculine.

Glanis Spix & Agassiz, 1829: 46. Type species: *Silurus bagre* Linnaeus, 1766. Type by subsequent designation by Kottelat (1988). Gender: Masculine.

Stearopterus Minding, 1832: 116. Type species: *Stearopterus bagre* Minding, 1832. Type by monotypy. Gender: masculine.

Breviceps Swainson, 1838: 328 and 343 (pre-occupied in Merrem, 1820). Type species: *Silurus bagre* Bloch, 1794. Type by monotypy. Gender: neuter.

Felichthys Swainson, 1839: 305. Type species: *Silurus bagre* Bloch, 1794. Type by being a replacement name. Replacement for *Breviceps* Swainson, 1838. Gender: masculine.

Ailurichthys Baird & Girard, 1854: 26. Type species: *Silurus marinus* Mitchill, 1815. Type by subsequent designation by Jordan & Evermann (1896). Gender: masculine.

Mystus Gray, 1854: 155 (pre-occupied in Scopoli, 1777). Type species: *Mystus carolinensis* Gronow, 1854. Type by subsequent designation by Jordan & Evermann (1896). Gender: masculine.

Anemanotus Fowler, 1944: 171. Type species: *Ailurichthys panamensis* Gill, 1863. Type by original designation. Originally a subgenus of *Ailurichthys*. Gender: masculine.

Diagnosis. The following exclusive (1 to 13) and shared (14 to 26) characters distinguishes *Bagre* from the remaining ariid genera: (1) about half of anterior cranial fontanel limited by posterior branches of mesethmoid (fig. 15); (2) anterior infraorbital shaped like number seven (fig. 16); (3) posterior infraorbital conspicuously curved medially (fig. 16); (4) lower end of subvertebral process rounded; (5) maxillary long and thin (fig. 17); (6) maxillary condyles well developed (fig. 17); (7) palatine claviform, anteriorly very broad (fig. 18); (8) lower part of palatine with a bony crest (fig. 18); (9) anterior process of metapterygoid very large (fig. 19); (10) third basibranchial hourglass shaped its posterior portion shorter and wider than anterior; (11) second dorsal process of cleithrum on inferior part of lateral face of this bone (fig. 20); (12) maxillary barbel compressed, tape-like; (13) one pair of mental barbells; (14) lachrymal with two anterior and one mesial branches (fig. 21) (shared with *Batrachoecephalus*); (15) occipital process ventral crest developed through the entire length of the process (shared with *Amphiarius*, *Aspistor*, *Cathorops*, *Cephalocassis*, *Cinetodus*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Pachyula* and *Sciades platypogon*); (16) contact face between transcapular process and basioccipital wide and depressed (shared with *Amphiarius*, *Arius gagara*, *A. maculatus*, *A. manillensis*, *Aspistor*, *Cathorops*, *Cryptarius*, *Doiichthys*, *Nedystoma*, *Nemapteryx*, *Notarius*, *Plicofollis platystomus* and *Potamosilurus latirostris*); (17) parasphenoid wing process very long and thin [shared with *Amphiarius*, *Aspistor*, *Cathorops* (with exception of *C. dasycephalus*), *Cochlefelis*, *Hemiaris*, *Notarius* (with exception of *N. planiceps*), *Pachyula*, *Plicofollis platystomus*, *Potamarius*, *Potamosilurus* (with exception of *P. velutinus*), *Sciades emphysetus*, *S. passany* and *S. proops*]; (18) face for articulation between palatine and lateral ethmoid slightly displaced to the anterior portion of former bone (fig. 18) (shared with *Doiichthys*); (19) tip of urohyal medial process bifid (fig. 22) (shared with *Doiichthys*); (20) urohyal lateral processes as long as or longer than medial process (fig. 22) (shared with *Potamarius*); (21) transversal crest associated with neural spine of fourth vertebra very high (shared with *Amphiarius*, *Batrachoecephalus*, *Cathorops*, *Cinetodus*, *Cryptarius*, *Ketengus*, *Hemiaris*, *Nemapteryx*, *Nedystoma*, *Notarius planiceps*, *Osteogeneiosus*, *Pachyula* and *Sciades platypogon*); (22) median crest associated with neural spine of third vertebra very high (shared with *Amphiarius*, *Aspistor*, *Cathorops*, *Cephalocassis*, *Cinetodus*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Pachyula* and *Sciades platypogon*); (23) more than 39 caudal vertebrae (shared with *Cochlefelis*); (24) base of adipose fin very short, less than one-half as long as anal-fin base [shared with *Brustarius*, *Cathorops*, *Cryptarius*, *Netuma* and *Plicofollis* (with exception of *P. platystomus*)]; (25) pectoral-fin spine prolonged as a tape-like filament (shared with *Arius madagascariensis*); (26) lateral line bifurcated at caudal region (shared with *Arius*, *Batrachoecephalus*, *Ketengus*, *Netuma*, *Osteogeneiosus*, *Plicofollis* and *Sciades couma*).

Supplementary morphological characters. Cephalic shield smooth, covered by muscle and scarcely visible under the skin; a well developed fenestra limited by frontal and lateral ethmoid bones visible under the skin, but sometimes obliterated by superficial ossifications; medial groove of neurocranium not very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel very reduced in small specimens, sometimes completely closed in large adult specimens; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular varying in size; epioccipital not invading dorsal portion of cephalic shield; occipital process short, progressively narrower toward its posterior part; anterior and median nuchal plates fused, indistinct (except in *B. bagre*) forming a structure of semi-lunar aspect; vomerine tooth plates present and transversely elongate; accessory tooth plates narrow and transversely elongate, bearing conical teeth; maxillary barbel basally bony, fleshy for remaining part of its length and compressed in form of tape; a single pair of mental barbells; base of adipose fin very short, less than one-half length of anal-fin base; lateral line bifurcated at caudal region, reaching base of caudal-fin upper and lower lobes; cleithrum wide with second dorsal process on its lower portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

Remarks. The genera *Bagre* Cloquet, 1816, *Bagre* Oken, 1817, *Glanis*, *Stearopterus*, *Breviceps non* Merrem, 1820, *Felichthys*, *Mystus non* Scopoli, 1777 were established based on the same type-species, *Silurus bagre* Linnaeus, 1766 and are therefore objective synonyms (Code of Zoological Nomenclature, article 61b).

Ailurichthys and *Anemanotus*, represented respectively by the type-species, *Silurus marinus* Mitchill, 1815 and *Aelurichthys panamensis* Gill, 1863, are subjective synonyms. The nominal genus *Breviceps* Swainson, 1838 and *Mystus* Gray, 1854 are invalid since the names are pre-occupied. *Breviceps* was replaced by *Felichthys* Swainson, 1839.

Distribution and habitat. Eastern and western America, predominantly marine waters, but also in brackish waters.



FIGURE 14. *Bagre bagre*, MZUSP 61339, 173 mm TL. Lateral view.

***Bagre bagre* (Linnaeus, 1766)**

(fig. 14)

Silurus bagre Linnaeus, 1766: 505. Type locality: Central America. No types known.

Galeichthys gronovii Valenciennes in Cuvier & Valenciennes, 1840b: 40. Type locality: Terre-Ferme ou de la Guyana, Maracaibo; Mana, R. Cayenne; Bahia. Syntypes: MNHN A-8977, Guyana; MNHN A-9368, Maracaibo.

Mystus carolinensis Gronow in Gray, 1854: 156. Type locality: Tropical America. No types known.

Distribution: North and eastern South America.

Countries: Colombia, Venezuela, Guyana, Surinam, French Guyana and Brazil.

Habitat: Predominantly marine waters, but also in brackish waters.

Maximum size: 550 mm TL.

Material examined: MZUSP 22691 (3 al) (1 c&s), Brazil, São Paulo, Santos; MZUSP 35843 (2 al) (1 c&s), Brazil, São Paulo, Guarujá, Perequê; MZUSP 51696 (2 es), Brazil, Espírito Santo, near rio Doce; MZUSP 51697 (1 es), Brazil, coast of São Paulo state; MZUSP 61339 (3, 104–177 mm SL), Brazil, Bahia, Caravelas, estuary and mouth of rio Caravelas.

***Bagre marinus* (Mitchill, 1815)**

Silurus marinus Mitchill, 1815: 433. Type locality: New York, U.S.A. No types known.

Galeichthys parrae Valenciennes in Cuvier & Valenciennes, 1840b: 33. Type locality: New York, New Orleans and Charlestown, U.S.A.; Rio de Janeiro, Brazil. Syntypes: MNHN 1565, New Orleans; MNHN A-8988, New York; MNHN A-9367 (dry), New York; MNHN B-0056, New York; MNHN B-0074, Brazil.

Galeichthys blochii Valenciennes in Cuvier & Valenciennes, 1840b: 44. Type locality: Surinam and Bahia, Brazil. No types known.

Galeichthys bahiensis Castelnau, 1855: 37, pl. 18 (fig. 1). Type locality: Bahia, Brazil. Holotype: MNHN B-692.

Aelurichthys longispinis Günther, 1864: 178. Type Locality: South America and Mexico. Syntypes: BMNH 1976.2.18.1; BMNH 1976.2.18.2.

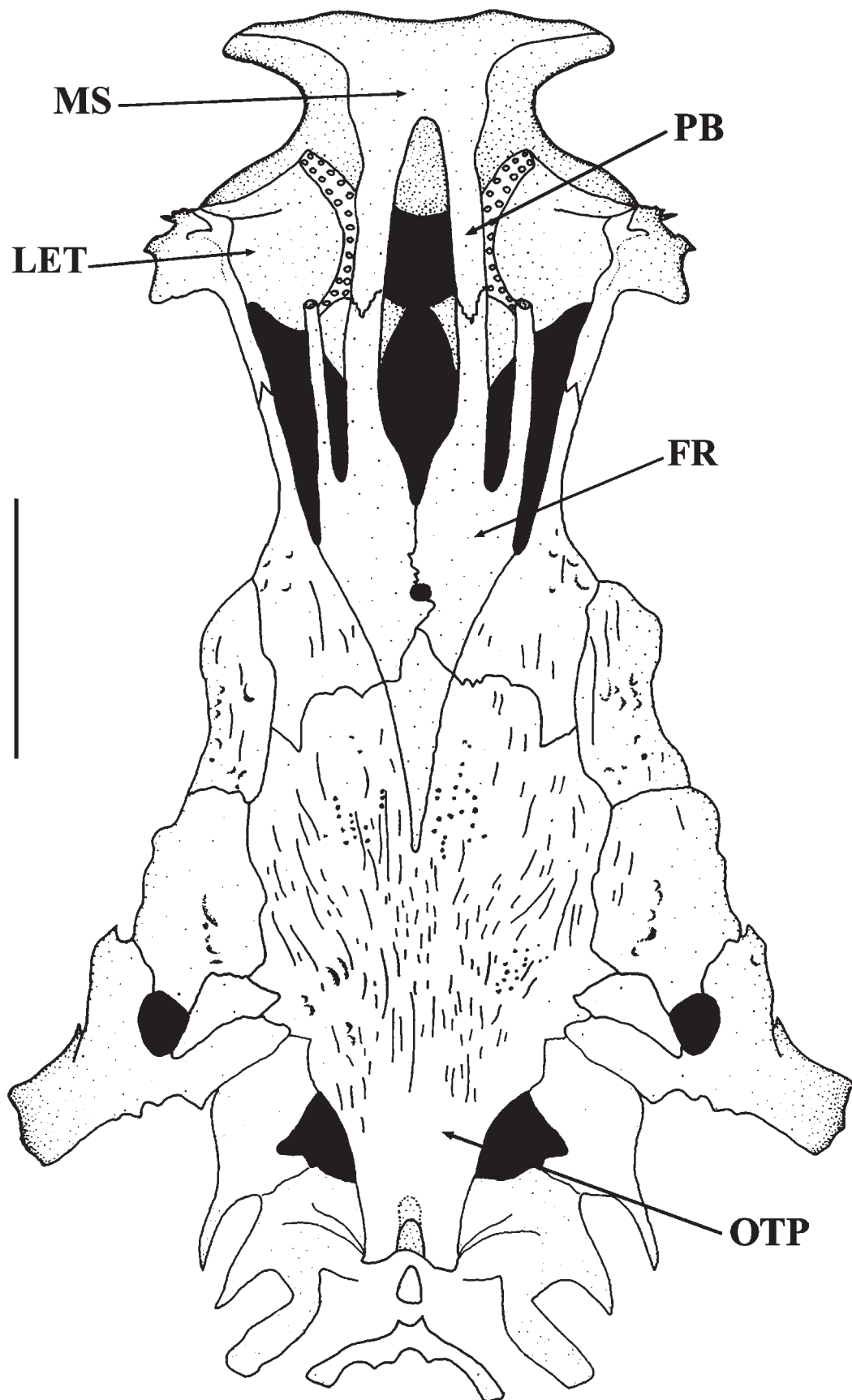


FIGURE 15. *Bagre bagre*, MZUSP 35843. Dorsal view of neurocranium. Scale bar = 10 mm. **FR** — frontal; **LET** — lateral ethmoid; **MS** — mesethmoid; **OTP** — occipital process; **PB** — posterior branch.

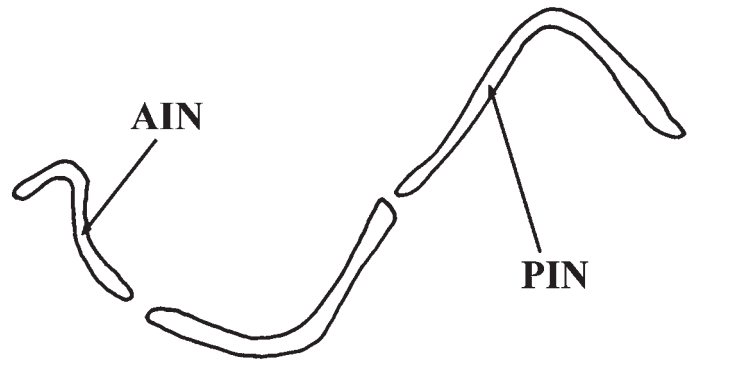


FIGURE 16. *Bagre bagre*, MZUSP 35843. Lateral view of infraorbital series. Scale bar = 4 mm. AIN — anterior infraorbital; PIN — posterior infraorbital.

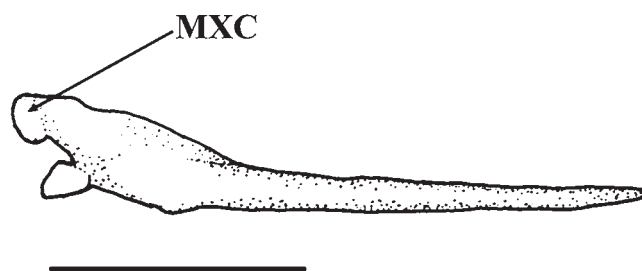


FIGURE 17. *Bagre bagre*, MZUSP 35843. Mesial view of maxillary. Scale bar = 4 mm. MXC — maxillary condyle.

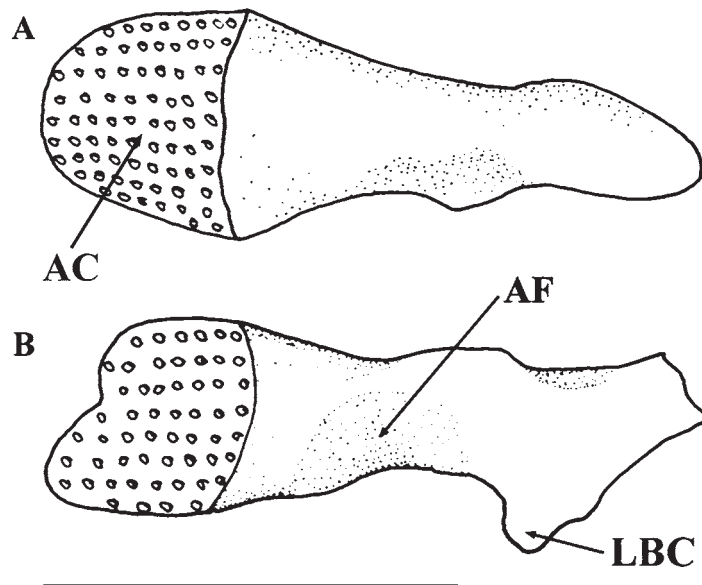


FIGURE 18. *Bagre bagre*, MZUSP 35843. Dorsal (A) and mesial (B) views of palatine. Scale bar = 4 mm. AC — anterior cartilage; AF — articulation facet; LBC — lower bony crest.

Distribution: Eastern America.

Countries: United States, Mexico, Cuba, Belize, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, French Guyana and Brazil.

Habitat: Marine and brackish waters.

Maximum size: 380 mm TL.

Material examined: AMNH 52052 (8 al, 139–163 mm TL), USA, Alabama, Mobile Dauphin Island and Vicinity; MZUSP 22201 (2 al) (1 c&s), without collecting data; MZUSP 24489 (1 al), Brazil, São Paulo, Ubatuba, Ponta Grossa.

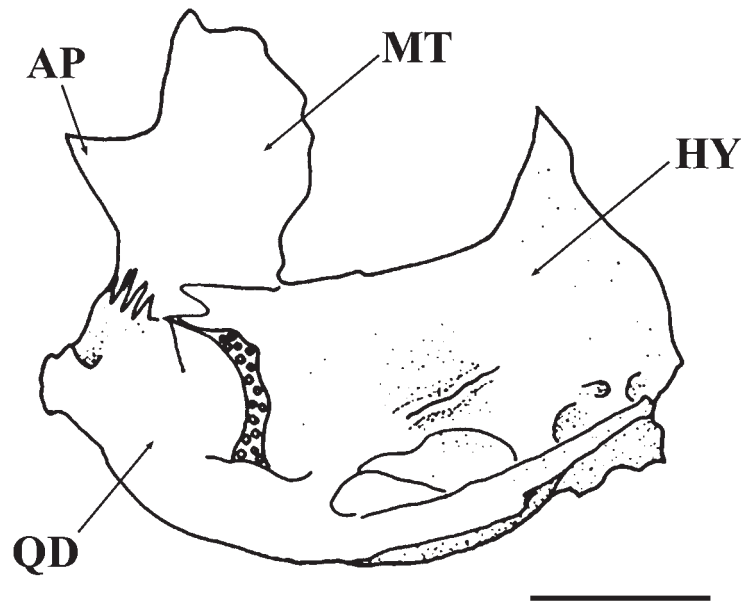


FIGURE 19. *Bagre pinnimaculatus*, FMNH 62447. Lateral view of suspensorium. Scale bar = 4 mm. **AP** — anterior process; **HY** — hyomandibular; **MT** — metapterygoid; **QD** — quadrate.

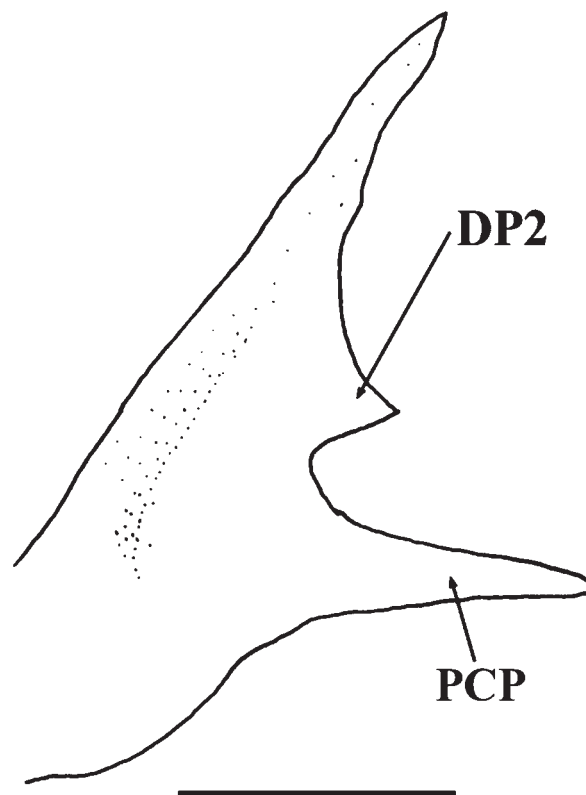


FIGURE 20. *Bagre bagre*, MZUSP 35843. Lateral view of cleithrum. Scale bar = 4 mm. **DP2** — second dorsal process; **PCP** — posterior cleithral process.

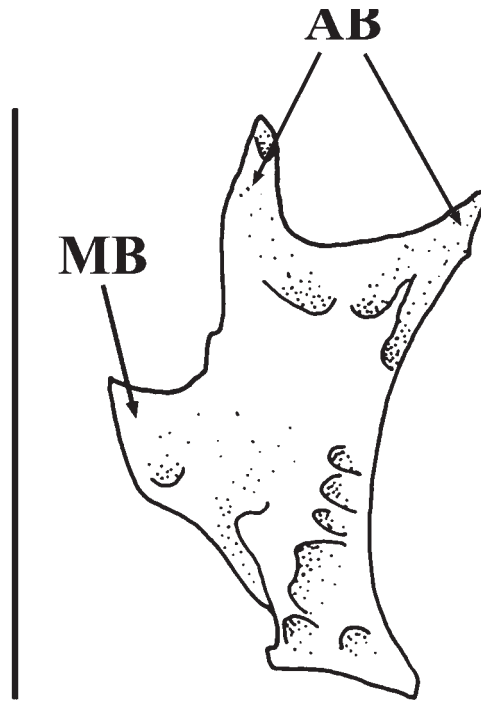


FIGURE 21. *Bagre bagre* MZUSP 35843. Dorsal view of lachrymal. Scale bar = 4 mm. **AB** — anterior branches; **MB** — mesial branch.

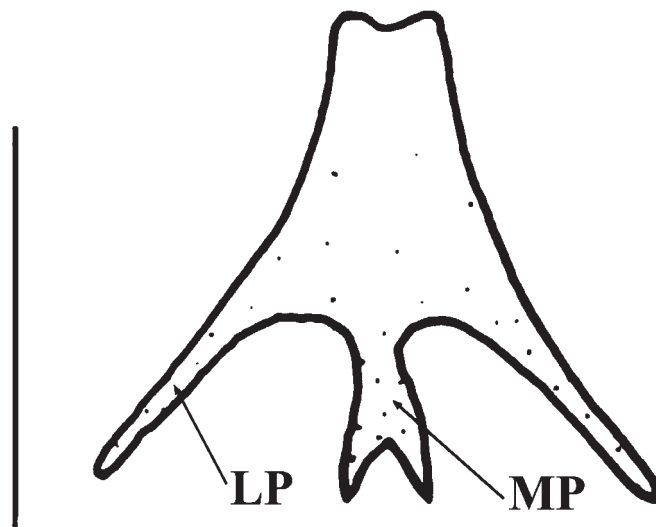


FIGURE 22. *Bagre bagre*, MZUSP 35843. Ventral view of urohyal. Scale bar = 4 mm. **LP** — lateral process; **MP** — medial process.

***Bagre panamensis* (Gill, 1863)**

Aelurichthys panamensis Gill, 1863: 172. Type locality: Western coast of Central America. Holotype: USNM (not found).

Aelurichthys nuchalis Günther, 1864: 179. Type locality: Pacific coast of Panama. Holotype: BMNH 1864.1.26.344.

Aelurichthys scutatus Regan, 1907: 116, pl. 15 (fig. 2), 19 (fig. 2). Type locality: Panama or Ecuador. Syntypes: BMNH 1903.5.15.328.

Aelurichthys isthmensis Regan, 1907: 117, pl. 15 (fig. 1), 19 (fig. 1). Type locality: Colón (Atlantic) Panama. Syntypes: BMNH 1877.5.31.7–8.

Distribution: Western America.

Countries: Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Colombia and Ecuador.

Habitat: Predominantly marine waters.

Maximum size: 380 mm TL.

Material examined: LACM W55-140 (10 al, 145–274 mm TL) (1 c&s), Mexico, Baja California, Almejas Bay; UMMZ 86047 (2 al, 205–215 mm TL), Mexico, Nayarit, San Blas.

***Bagre pinnimaculatus* (Steindachner, 1876)**

?*Galeichthys eydouxii* Valenciennes in Cuvier & Valenciennes, 1840b: 43. Type locality: rio Guayaquil, Ecuador. Holotype: MNHN 1572.

Aelurichthys pinnimaculatus Steindachner, 1877: 565 [15], pl. 8. Type locality: Altata, Panama and western coast of Costa Rica. Syntypes: MCZ 4941, MCZ 23746–47, NMW 47895, NMW 47897–99, NMW 50577, USNM 123011; MCZ 23746, Panama.

Distribution: Western America.

Countries: Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Colombia and Ecuador.

Habitat: Marine and brackish waters.

Maximum size: 500 mm TL.

Material examined: FMNH 62447 (5 al, 191–219 mm TL) (1 c&s), Panama, Panama Bay, offshore bet. Punta de Hicacal and rio Pasiga; USNM 286506 (2 al, 272–339 mm TL), Colombia.

Species inquirendae

Pimelodus coruscans Lichtenstein, 1819: 58. Type locality: Brazil. Holotype: Not known.

Felichthys filamentosus Swainson, 1839: 392. Type locality: Estuaries and rivers near Pernambuco, Brazil. No types known.

***Batrachocephalus* Bleeker, 1846 (fig. 23)**

Batrachocephalus Bleeker, 1846: 176. Type species: *Batrachocephalus ageneiosus* Bleeker, 1846 (= *Ageneiosus mino* Hamilton, 1822). Type by monotypy. Gender: Masculine.

Diagnosis. The combination of exclusive (1 to 6) and non-exclusive (7 to 14) characters define and distinguishes *Batrachocephalus* from all other ariid genera: (1) accessory tooth plates located between lateral ethmoid and premaxilla; (2) nasal fan shaped; (3) anterior part of opercle subrectangular (fig. 24); (4) lateral portion of ceratohyal columnar and very strong; (5) third basibranchial cup-shaped, very long and thin (fig. 25); (6) maxillary barbel absent; (7) mesethmoid very wide at median portion (shared with *Bagre*, *Brustiarius*, *Carlarius*, *Cochlefelis*, *Doiichthys*, *Sciades couma*, *S. emphysetus*, *S. guatemalensis*, *S. herzbergii*, *S. leptaspis*, *S. passany* and *S. proops*); (8) accessory tooth plates small and oval-shaped (shared with *Cathorops*, *Cephalocassis melanochir*, *Cryptarius*, *Doiichthys* and *Hemiaris*); (9) posterior cranial fontanel absent [shared with *Sciades* (with exception of *S. platypogon*)]; (10) epiphyseal bar indistinct [shared with *Sciades* (with exception of *S. platypogon*)]; (11) lachrymal with two anterior and one mesial branches (fig. 26) (shared with *Bagre*); (12) epihyal long its length more than 1.5 longer than its depth (fig. 27) (shared with *Bagre*, *Brustiarius* and *Cochlefelis*); (13) urohyal anterior margin not notched (shared with *Cathorops* and *Plicofollis*).

platystomus); (14) second dorsal process of cleithrum parallel to posterior cleithral process [shared with *Aspistor*, *Bagre*, *Brustiarius*, *Carlarius*, *Cinetodus*, *Cochlefelis*, *Neoarius*, *Netuma*, *Notarius*, *Pachyula*, *Potamosilurus* (with exception of *P. velutinus*) and *Sciades*].

Supplementary morphological characters. Cephalic shield granulated visible under the skin; very small fenestra limited by frontal and lateral ethmoid bones barely visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel entirely closed at all stages of development; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular very well developed; epioccipital not invading into dorsal portion of cephalic shield; occipital process short, progressively narrower toward its posterior part; anterior and median nuchal plates fused, indistinct forming a structure of semi-lunar aspect; vomerine tooth plates absent; accessory tooth plates narrow and transversely elongate, bearing molariform teeth; maxillary barbel absent; two pairs of mental barbels; base of adipose fin moderately long, about half the length of anal-fin base; lateral line bifurcated at caudal region, reaching base of caudal-fin upper and lower lobes; cleithrum wide, with second dorsal process on its upper portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

Distribution and habitat. South and southeast Asia, marine and brackish waters.



FIGURE 23. *Batrachocephalus mino*, FMNH 68052, 178 mm TL. Lateral view.

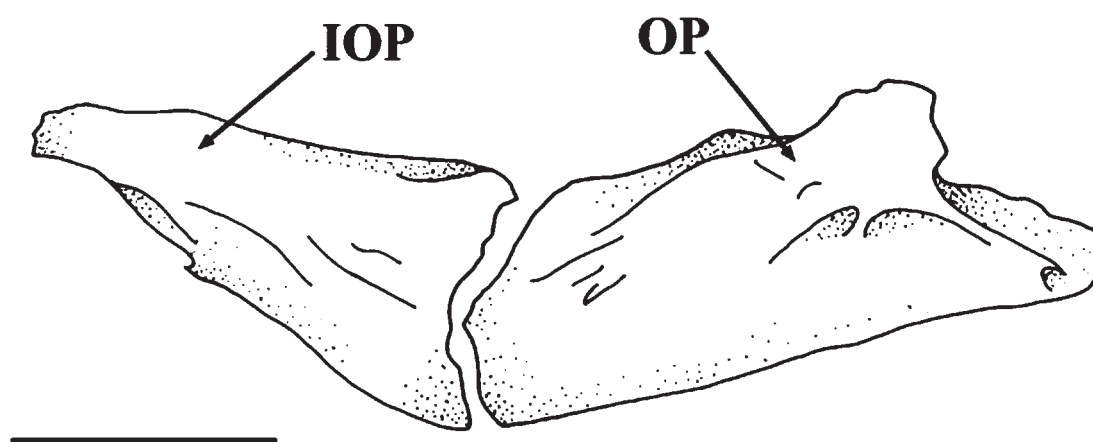


FIGURE 24. *Batrachocephalus mino*, FMNH 68052. Lateral view of interopercle and opercle. Scale bar = 4 mm. IOP — interopercle; OP — opercle.

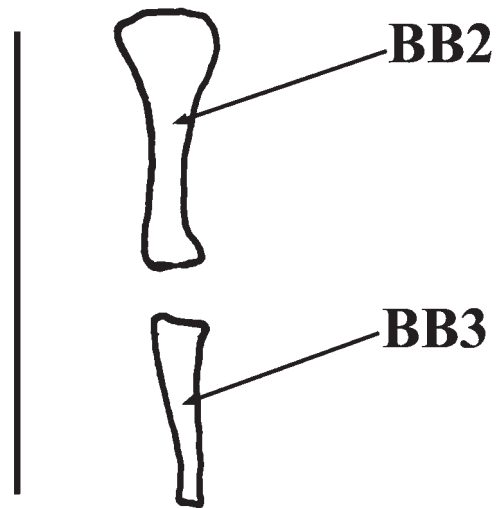


FIGURE 25. *Batrachocephalus mino*, FMNH 68052. Dorsal view of second and third basibranchials. Scale bar = 4 mm. **BB2** — second basibranchial; **BB3** — third basibranchial.

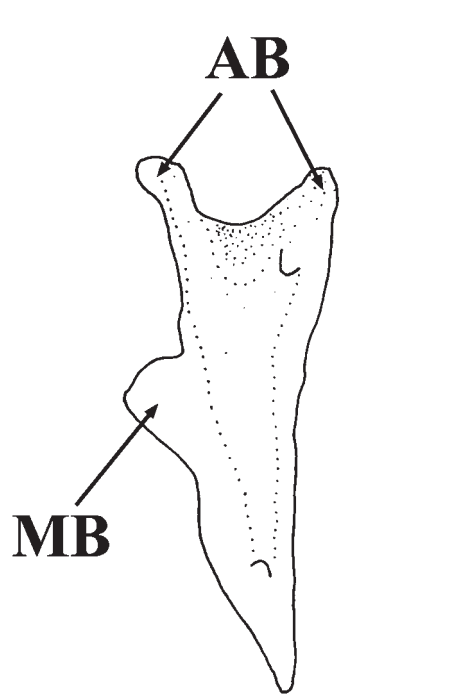


FIGURE 26. *Batrachocephalus mino*, FMNH 68052. Dorsal view of lachrymal. Scale bar = 4 mm. **AB** — anterior branches; **MB** — mesial branch.

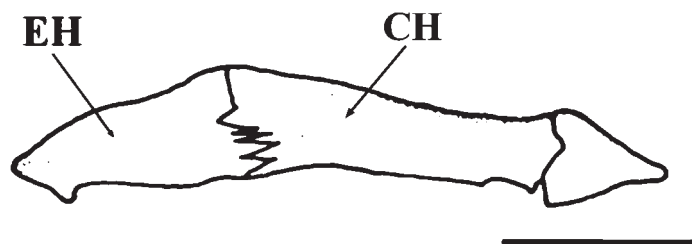


FIGURE 27. *Batrachocephalus mino*, FMNH 68052. Dorsal view of hyoid arch. Scale bar = 4 mm. **CH** — ceratohyal; **EH** — epihyal.

***Batrachocephalus mino* (Hamilton, 1822)**

(fig. 23)

Ageneiosus mino Hamilton, 1822: 159. 375. Type locality: Upper Ganges estuaries. No types known.

Batrachocephalus ageneiosus Bleeker, 1846: 176. Type locality: Jakarta, Java, Indonesia. No types known.

Distribution: South and southeast Asia.

Countries: Pakistan, India, Sri Lanka, Bangladesh, Myanmar, Malaysia, Thailand to Indonesia.

Habitat: Marine and brackish waters.

Maximum size: 250 mm TL.

Material examined: FMNH 68052 (4 al, 142–178 mm TL) (1 c&s), Malaysia, Sabah, Kinabatangan dist., Deramakot Camp, aquatic sta. 2.

***Brustiarius* Herre, 1935**

(fig. 28)

Brustiarius Herre, 1935: 388. Type species: *Arius nox* Herre, 1935. Type by original designation and also by monotypy.

Gender: masculine. Originally a subgenus of *Arius*.

Pararius Whitley, 1940: 409. Type species: *Arius proximus* Ogilby, 1898. Type by original designation. (Subgenus of *Tachysurus*). Gender: masculine.

Diagnosis. The species of *Brustiarius* can be distinguished from the remaining ariid genera by the combination of the following exclusive (1 to 3) and shared (4 to 8) characters: (1) tooth plates associated with vomer butterfly shaped; (2) accessory tooth plates round and lateral to vomer; (3) premaxillary conspicuously longer at its lateral than at its mesial part; (4) orbitosphenoid laterally expanded [shared with *Arius*, *Carlarius*, *Cinetodus*, *Genidens*, *Netuma*, *Notarius planiceps*, *Plicofollis* (with exception of *P. platystomus*), *Potamosilurus* (with exception of *P. latirostris*) and *Sciades* (with exception of *S. couma*, *S. emphysetus*, *S. passany*, *S. proops*, *S. seemanni* and *S. sagor*)]; (5) contact face between first epibranchial and first pharyngobranchial very pronounced [shared with *Arius arius*, *A. gagora*, *A. madagascariensis*, *Nedystoma*, *Osteogeneiosus* and *Plicofollis* (with the exception of *P. platystomus*) and *Potamosilurus*]; (6) lateral margin of third pharyngobranchial very conspicuous and pointed (shared with *Arius*, *Nedystoma*, *Neoarius*, *Netuma*, *Plicofollis* and *Potamosilurus*); (7) 14 or fewer ribs (shared with *Amphiarius*, *Arius*, *Aspistor*, *Batrachocephalus*, *Cathorops*, *Cephalocassis*, *Cinetodus*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Hemiaris*, *Ketengus*, *Nedystoma*, *Nemapteryx*, *Osteogeneiosus*, *Pachyula*, *Plicofollis platystomus*, *Potamarius* and *Potamosilurus*); (8) base of adipose fin very short, less than one-half as long as anal-fin base [shared with *Bagre*, *Cathorops*, *Cryptarius*, *Netuma* and *Plicofollis* (with exception of *P. platystomus*)].

Supplementary morphological characters. Cephalic shield granulated visible under the skin; fenestra limited by frontal and lateral ethmoid bones of moderate size visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel very reduced, in many cases closing entirely with growth; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular very reduced; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, moderately long and wide, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; vomerine tooth plates forming a butterfly shaped structure; accessory tooth plates present, round and lateral to plates related with vomer bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very short, less than one-half length of anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide, with second dor-

sal process on its upper portion; posterior cleithral process of moderate size and distinct from second dorsal process of cleithrum.

Remarks. The inclusion of *Arius proximus* Ogilby, 1898 was based on examination of external morphological characters in preserved specimens and diagnostic characters found in the literature. *B. proximus* is the type-species of *Pararius* and its condition as subjective synonym of *Brustiarius* needs confirmation.

Distribution and habitat. Northern New Guinea, freshwater.



FIGURE 28. *Brustiarius nox*, CAS 63701, 211 mm TL. Lateral view.

***Brustiarius nox* (Herre, 1935)**

(fig. 28)

Arius nox Herre, 1935: 388. Type locality: Sepik, R. at Nyaurangai, Papua New Guinea. Holotype: FMNH 17195. Paratypes FMNH 17196–97, 17918–200, SU 24451, 24452, 69115.

Distribution: Northern New Guinea.

Countries: Papua New Guinea.

Habitat: Freshwater.

Maximum size: 285 mm TL.

Material examined: AMS I.27407-002 (1 c&s), Papua New Guinea, Angoram, Sepik River; CAS 63701 (6 al) (1 c&s), Papua New Guinea, Madang, Regene roundwater (oxbow lake of Ramu River); UMMZ 214018 (2 al, 211–236 mm TL), Australia, Papua New Guinea, Angoram, Sepik River.

***Brustiarius proximus* (Ogilby, 1898)**

Arius proximus Ogilby, 1898: 280. Type locality: Darwin, Northern Terr., Australia. Holotype: AMS I.25691-001.

Arius arafurensis Hardenberg, 1948: 280. Type Locality: Fish market, Dobo, Aru Is., Indo-Australian Archipelago. Holotype: whereabouts unknown.

Distribution: Southern New Guinea and northern Australia.

Countries: Papua New Guinea and Australia.

Habitat: Marine and brackish waters.

Maximum size: 410 mm TL.

Material examined: USNM 173568 (1 al, 356 mm TL), Australia, Northern Territory, night cliff, 7 mi north of Darwin, rocky coves, sandy beaches.

***Brustiarius solidus* (Herre, 1935)**

Arius solidus Herre, 1935: 385. Type locality: Sepik R. at Timbunke, New Guinea. Holotype: FMNH 17201. Paratypes: FMNH 17202, 17203-06, 17207-10, SU 24444-45, 24447-49.

Arius kanganamanensis Herre, 1935: 387, fig. 32. Type locality: Sepik River at Kanganam (175 mi. from sea), New Guinea. Holotype: FMNH 17194. Paratypes: SU 24450.

Arius microstomus Nichols, 1940: 2. Type locality: Bernhard Camp, Idenburg River, Irian Jaya, Indonesia. Holotype: AMNH 15041. Paratypes: AMNH 20929.

Hemipimelodus bernhardi Nichbols, 1940: 3. Type locality: Bernhard Camp, Idenburg Camp, Idengurg River, Irian Jaya, Indonesia. Holotype: AMNH 15039. Paratypes: AMNH 15040.

Distribution: Northern New Guinea.

Countries: Indonesia and Papua New Guinea.

Habitat: Freshwater.

Maximum size: 490 mm TL.

Material examined: AMNH 58711 (5 al, 104–116 mm TL), Papua New Guinea, east Sepik River, Magendo 2 Village; MZUSP 38658 (3 al) (1 c&s), Papua New Guinea, Sepik River, Magendo Two Village, near Angoram.

***Carlarius* new genus**

(fig. 29)

Type species: *Arius heudelotii* Valenciennes, 1840.

Diagnosis. Three shared characters distinguishes *Carlarius* from the remaining ariid genera: (1) mesethmoid wide at its median portion (shared with *Amphiarius*, *Arius caelatus*, *A. madagascariensis*, *Aspistor*, *Cryptarius*, *Galeichthys*, *Genidens*, *Hemarius*, *Nedystoma*, *Nemapteryx*, *Neoarius*, *Netuma*, *Notarius*, *Plicofollis*, *Potamosilurus* and *Sciades assimilis*, *S. bonillai*, *S. felis*, *S. platypogon*, *S. sagor* and *S. seemanni*); (2) tooth plates associated with vomer absent [shared with *Amphiarius*, *Arius*, *Batrachocephalus*, *Cathorops* (with exception of *C. dasycephalus*), *Cephalocassis*, *Cinetodus*, *Cryptarius*, *Doiichthys*, *Genidens genidens*, *Ketenogus*, *Nedystoma*, *Osteogeneiosus*, *Pachyula*, *Plicofollis platystomus*, *Potamarius* and *Potamosilurus velutinus*]; (3) epioccipital dorsally exposed [shared with *Amphiarius rugispinis*, *Aspistor*, *Cinetodus*, *Pachyula* and *Plicofollis* (with exception of *P. platystomus* and *P. tenuispinis*)].

Supplementary morphological characters. Cephalic shield conspicuously granulated visible under the skin; a moderately developed fenestra limited by frontal and lateral ethmoid bones visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel of moderate size, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular moderately large; epioccipital invading dorsal portion of cephalic shield; occipital process triangular, moderately long and wide, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; vomerine tooth plates absent; accessory tooth plates well developed oval shaped, with conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half the length of anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide, with second dorsal process on its upper portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

Remarks. *Carlarius* is established to accommodate all ariid species from the occidental portion of the African continent that in previous classifications were included in *Arius* (Fowler, 1936; Taylor, 1986, 1990; Burgess, 1989; Daget, 1992) and were recognized by Marceniuk (2003) as a monophyletic lineage. They can

be easily differentiated from all members of *Arius* by having the lateral line not bifurcated at caudal region, reaching caudal-fin upper lobe and the epioccipital bone exposed on the dorsal part of the cranium (see also diagnosis of the genus). *C. gigas* (Boulenger, 1911) was not examined and its inclusion in the genus is based on diagnostic characters from the literature.

Distribution and habitat. Western Africa, brackish and fresh waters.

Etymology. The first part of the generic name honors Dr. Carl Ferraris, Research Associate at the California Academy of Sciences for his contribution to the knowledge of Siluriformes fishes and continuous support and encouragement throughout the development of this work. The second part is from the frequently used generic name *Arius*.



FIGURE 29. *Carlarius heudelotii*, USNM 297075, 345 mm TL. Lateral view.

***Carlarius gigas* (Boulenger, 1911)**

Arius gigas Boulenger, 1911: 386, fig. 298. Type locality: Lokoja, Upper Niger River, Nigeria. Holotype: BMNH 1904.1.20.41.

Distribution: Niger River.

Countries: Nigeria.

Habitat: Freshwaters.

Maximum size: 1.500 mm TL.

***Carlarius heudelotii* (Valenciennes, 1840)**

(fig. 29)

Arius heudelotii Valenciennes in Cuvier & Valenciennes, 1840b: 73, pl. 428. Type locality: Senegal. Syntypes: MNHN B-0689.

Arius mercatoris Poll, 1949: 201, fig. 8. Type locality: Atlantic, 12°34'N, 17°09'W, 8-10 fm. Holotype: IRSNB 89.

Distribution: Niger River

Countries: Senegal, Guinea Bissau and Nigeria.

Habitat: Freshwaters.

Maximum size: 760 mm TL.

Material examined: USNM 293075 (3 al, 340–395 mm TL) (1 c&s), Guinea Bissau, 11° 38' N – 17° 00' W.

***Carlarius latiscutatus* (Günther, 1864)**

?*Pimelodus gambensis* Bowdich, 1825: 234, fig. 50. Type locality: Gambia River, Nigeria. No types known.

Arius latiscutatus Günther, 1864: 151. Type locality: Fernando Póo Island, Equatorial Guinea, Gulf of Guinea. Lectotype: BMNH 1864.1[or 2].26.1.

Arius lagoensis Pfaff, 1933: 298, figs. 9–10. Type locality: Lagos, Nigeria. Holotype: ZMUC 1.8.1928.87. Paratypes: ZMUC 1.8.1928.88.

Distribution: Western Africa.

Countries: Senegal, Guinea Bissau, Equatorial Guinea, Sierra Leone, Liberia, Ghana, Togo, Benin, Nigeria, Cameroon, Gabon, Congo, Zaire, Angola and Namibia.

Habitat: predominantly brackish waters.

Maximum size: 700 mm TL.

Material examined: USNM 00188475 (4 al, 263–340 mm TL) (1 c&s), Nigeria, off Lagos.

***Carlarius parkii* (Günther, 1864)**

Arius parkii Günther, 1864: 154. Type locality: Lagos, Nigeria. Lectotype: BMNH 1865.7.4.4. Paralectotypes: BMNH 1847.4.14.26, 1852.9.13.47.

Arius capellonis Steindachner, 1867: 64. Type locality: Monrovia, Liberia. Holotype: not found at NMW.

Distribution: Western Africa.

Countries: Mauritania, Senegal, Guinea Bissau, Sierra Leone, Liberia, Ghana, Togo, Benin, Nigeria, Cameroon, Equatorial Guinea, Gabon, Congo, Zaire and Angola.

Habitat: Marine and brackish waters.

Maximum size: 750 mm TL.

Material examined: CAS 115845 (2 al, 183–187 mm TL), Cameroon; USNM 218279 (5 al, 182–300 mm TL) (1 c&s), Sierra Leone.

***Cathorops* Jordan & Gilbert, 1882**

(fig. 30)

Cathorops Jordan & Gilbert, 1882: 39. Type species: *Arius hypophthalmus* Steindachner, 1876. Type by original designation and also monotypy. Originally a subgenus of *Arius*. Gender: masculine.

Diagnosis. *Cathorops* can be diagnosed by an extensive list of exclusive (1 to 6) and shared (7 to 18) characters: (1) transcapular process depressed; (2) otic capsules similar, very little differentiated from each other; (3) bony crest on posterior portion of basioccipital folded over exoccipital; (4) lateral process of basioccipital very long (fig. 31); (5) anterior edge of subvertebral process keeled (fig. 31); (6) opening of aortic canal inside base of occipital process (fig. 31); (7) posterior branches of mesethmoid thin (fig. 32) [shared with *Bagre* (with exception of *B. panamensis*), *Cephalocassis*, *Doiichthys*, *Ketengus*, *Nedystoma* and *Nemapteryx*]; (8) posterior branches of mesethmoid parallel along entire extension (fig. 32) (shared with *Cephalocassis*, *Doiichthys*, *Ketengus*, *Nedystoma* and *Nemapteryx*); (9) frontal bone contributing with two thirds to the formation of bony bridge between this bone and lateral ethmoid (fig. 32) (shared with *Amphiarius*, *Cephalocassis* and *Hemiaris*); (10) extrascapular subtriangular (fig. 32) (shared with *Cinetodus*); (11) end of subvertebral process in form of spatula (shared with *Cephalocassis*, *Doiichthys*, *Hemiaris*, *Nedystoma* and *Nemapteryx*); (12) premaxillary narrow, almost as long as wide (shared with *Cephalocassis*, *Cinetodus* and *Potamarius*); (13) anterior edge of opercle straight (fig. 33) [shared with *Plicofollis* (with exception of *P. platystomus*)]; (14)

posterior edge of interopercle angulated (fig. 33) [shared with *Plicofollis* (with exception of *P. platystomus*)]; (15) upper crest of hyomandibular short and high (shared with *Amphiarius*, *Arius*, *Aspistor*, *Batrachocephalus*, *Hemiaris*, *Ketengus*, *Nedystoma*, *Notarius*, *Osteogeneiosus*, *Plicofollis platystomus* and *Potamosilurus*); (16) inferior crest of hyomandibular absent (shared with *Cephalocassis* and *Ketengus*); (17) urohyal anterior margin not notched (shared with *Batrachocephalus* and *Plicofollis platystomus*); (18) superficial ventral ossification convexly rounded (shared with *Cephalocassis borneensis*).

The definition of *Cathorops* is also supported by exclusive (1 to 4) and shared (5 to 12) characters absent only in *Cathorops dasycephalus*: (1) mesethmoid and lateral ethmoid delimiting a small fenestra (fig. 32); (2) more than three fifths of the temporal fossa formed by extrascapular (fig. 32); (3) females with molariform dentary teeth sometimes present in males; (4) cardinal veins passing beside the aortic channel; (5) mesethmoid posterior horn tubular and very thin (fig. 32) (shared with *Ketengus*); (6) mesethmoid posterior branches very long, more than half as long as cranial fontanel (fig. 32) (shared with *Nemapteryx*); (7) posterior cranial fontanel reduced to a small hole (fig. 32) [shared with *Bagre*, *Brustiarius*, *Galeichthys*, *Genidens*, *Netuma* and *Plicofollis* (with exception of *P. platystomus*)]; (8) posterior cranial fontanel limited by frontal bones (fig. 32) (shared with *Bagre*, *Brustiarius*, *Carlarius*, *Galeichthys*, *Genidens*, *Netuma*, *Osteogeneiosus*, *Plicofollis*, *Potamarius* and *Sciades platypogon*); (9) a very restricted area for insertion of gill rakers on fifth ceratobranchial (shared with *Batrachocephalus*, *Doiichthys*, *Ketengus* and *Nedystoma*); (10) second hypobranchial transversely elongate with its mesial edge acute (fig. 34) (shared with *Cephalocassis*, *Doiichthys* and *Nedystoma*); (11) anterior process of first hypobranchial very pronounced (fig. 34) (shared with *Cephalocassis*, *Doiichthys* and *Nedystoma*); (12) posterior cleithral process very short, (fig. 35) (shared with *Cephalocassis*, *Doiichthys*, *Hemiaris*, *Nedystoma* and *Nemapteryx*).



FIGURE 30. *Cathorops hypophthalmus*, USNM 293275, 210 mm TL. Lateral view.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal limiting a wide fenestra very conspicuous visible under the skin (except in *C. dasycephalus*); medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel very reduced (except in *C. dasycephalus*); fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular very reduced; epioccipital not invading dorsal portion of cephalic shield; occipital process funnel shaped moderately long, its posterior part considerably narrower than its base; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; vomerine tooth plates absent (except in *C. dasycephalus*); accessory tooth plates small, oval and perpendicularly disposed, bearing molar-like teeth (except in *C. dasycephalus*); maxillary bar-

bel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very short, less than one-half length of anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum thin with second dorsal process on its upper portion; posterior cleithral process short (except in *C. dasycephalus*) and distinct from second dorsal process of cleithrum.

Remarks. The inclusion of *C. steindachneri* (Gilbert & Starks, 1904) was based on examination of external morphological characters obtained from the literature.

Distribution and habitat. Eastern and western Central and South America, brackish and freshwater.

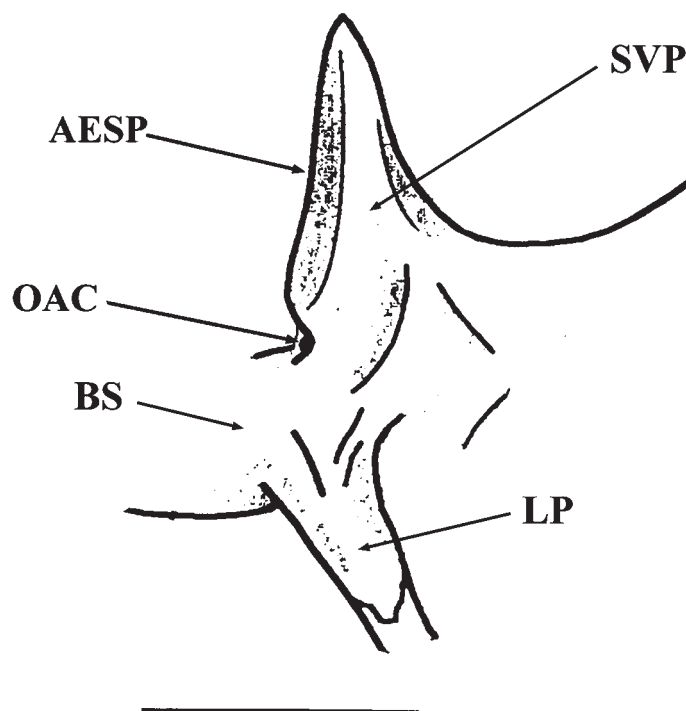


FIGURE 31. *Cathorops agassizii*, MZUSP 49346. Ventral view of subvertebral process. Scale bar = 4 mm. **AESP** — anterior edge of subvertebral process; **BS** — basioccipital; **LP** — lateral process; **OAC** — opening of the aortic canal; **SVP** — subvertebral process.

Cathorops agassizi (Eigenmann & Eigenmann, 1888)

Tachisurus agassizi Eigenmann & Eigenmann, 1888: 145. Type locality: Rio Grande do Sul (probably erroneous), Brazil. Holotype: MCZ 7670.

Arius pleurops Boulenger, 1897: 296. Type locality: Magoarisinho, Cape Maguarinho, Brazil. Holotype: BMNH 1897.7.17.7

Distribution: Northeastern South America.

Countries: Guyana and Brazil.

Habitat: Brackish and freshwater.

Maximum size: 220 mm TL.

Material examined: MZUSP 37232 (17 al) (2 c&s), Brazil, Maceió, Alagoas, lagoa Mundaú; MZUSP 49346 (4 al) (2 es), Brazil, Pará, baía de Marajó, ilha do Mosqueiro, Cajueiro; MZUSP 37231 (7 al) (1 es), Brazil, Alagoas, Maceió, lagoa Mundaú; MZUSP 49358 (6 al) (2 es), Brazil, Sergipe; MZUSP 37228 (1 es), Brazil, Maranhão, ilha de São Luís, estreito de Coqueiro.

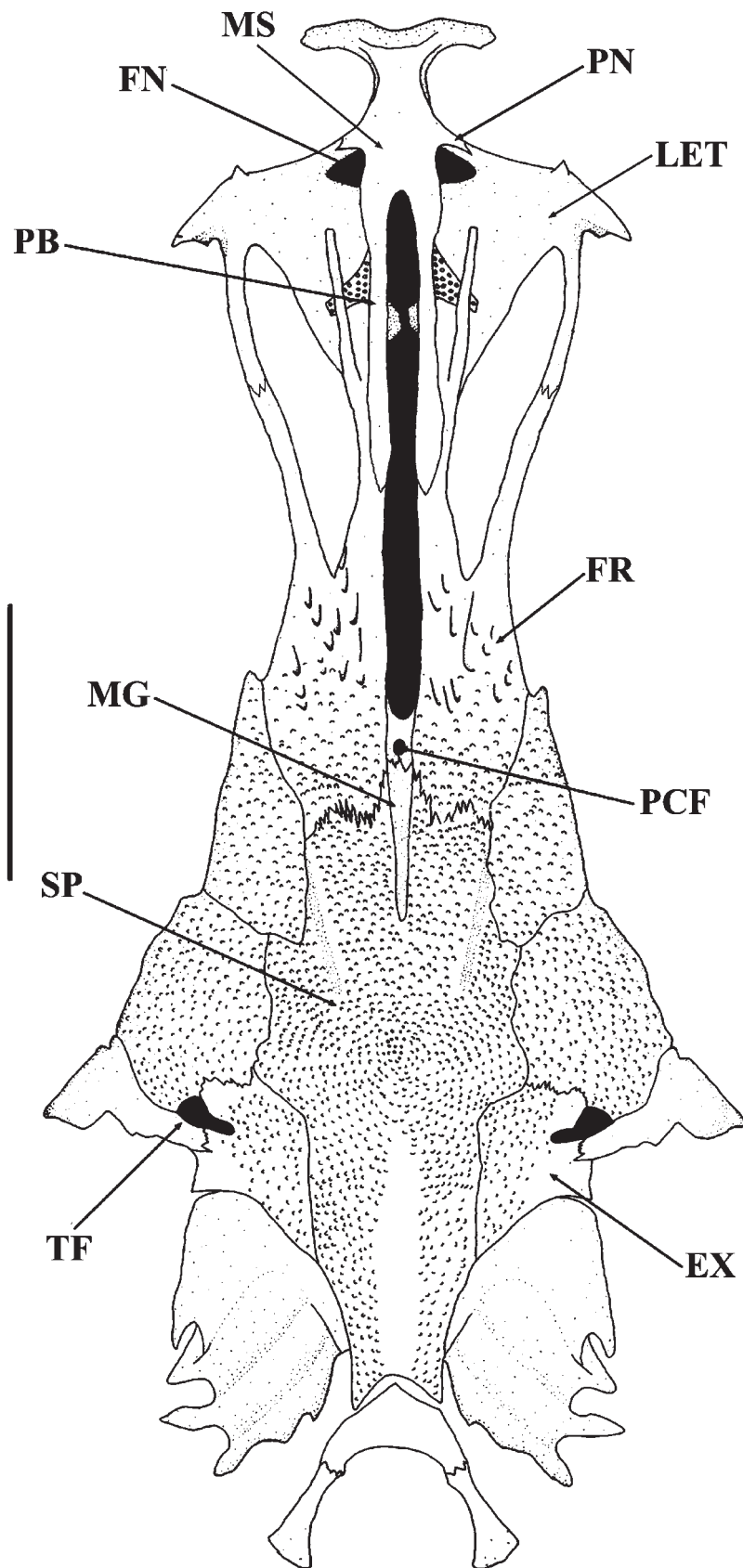


FIGURE 32. *Cathorops agassizii*, MZUSP 37232. Dorsal view of neurocranium. Scale bar = 10 mm. **EX** — extrascapular; **FN** — fenestra; **FR** — frontal; **LET** — lateral ethmoid; **MG** — medial groove of neurocranium; **MS** — mesethmoid; **PB** — posterior branch; **PCF** — posterior cranial fontanel; **PN** — posterior horn; **SP** — supraoccipital; **TF** — temporal fossa.

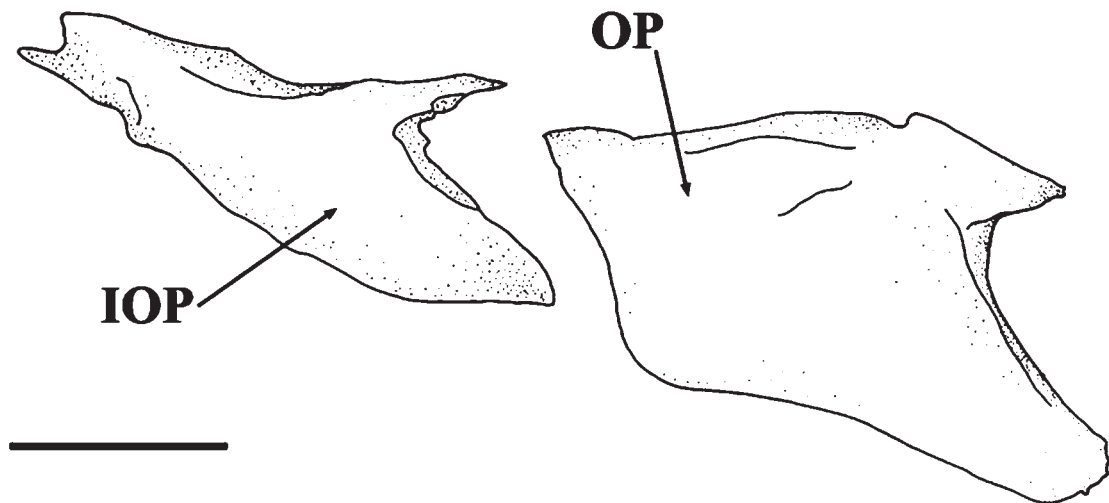


FIGURE 33. *Cathorops agassizii*, MZUSP 37232. Lateral view of interopercle and opercle. Scale bar = 4 mm. **IOP** — interopercle; **OP** — opercle.

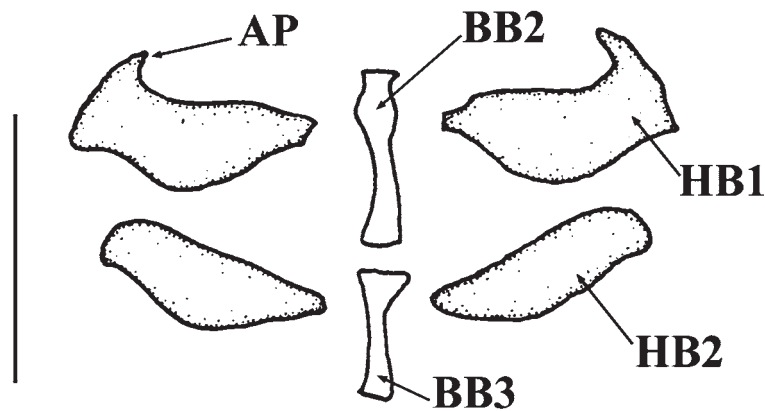


FIGURE 34. *Cathorops agassizii*, MZUSP 37232. Dorsal view of hypobranchials and basibranchials. Scale bar = 4 mm. **AP** — anterior process; **BB2** — second basibranchial; **BB3** — third basibranchial; **HB1** — first hypobranchial; **HB2** — second hypobranchial.

Cathorops aguadulce (Meek, 1904)

Galeichthys aguadulce Meek, 1904: 9, pl. 4. Type locality: Río Tesechocán at Pérez, Veracruz, río Papaloapam basin, Mexico. Holotype: FMNH 4678.

Distribution: Papaloapam River basin.

Countries: Mexico.

Habitat: Entirely in fresh waters.

Maximum size: 210 mm TL.

Material examined: USNM 134330 (11 al) (2 es), Guatemala, lake Yzabal embayment about 3 mi. west of El Estor.

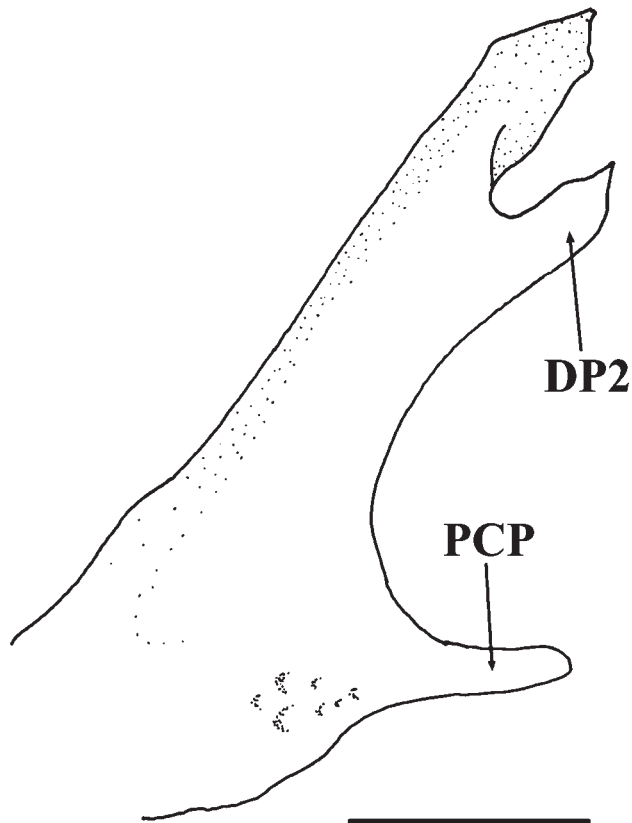


FIGURE 35. *Cathorops agassizii*, MZUSP 37232. Lateral view of cleithrum. Scale bar = 4 mm. **DP2** — second dorsal process; **PCP** — posterior cleithral process.

***Cathorops arenatus* (Valenciennes, 1840)**

Arius arenatus Valenciennes in Cuvier & Valenciennes, 1840b: 106. Type locality: Surinam. Holotype: RMNH 3099.

Arius fissus Valenciennes in Cuvier & Valenciennes, 1840b: 107. Type locality: Surinam. Holotype: RMNH 3036.

Distribution: Northeastern South America.

Countries: Venezuela, Guyana, Surinam, French Guiana and Brazil.

Habitat: Marine and brackish waters.

Maximum size: 250 mm TL.

Material examined: USNM 233482 (+40 al) (2 es), Venezuela, mouth of rio Orinoco, 10 naut. mi. upstream from sea buoy; USNM 286395 (17 al), Suriname, off Surinam.

***Cathorops dasycephalus* (Günther, 1864)**

Arius dasycephalus Günther, 1864: 157. Type locality: Oahu I., Hawaiian Is., U.S.A.. Holotype: BMNH 1855.9.19.1100.

Tachisurus longicephalus Eigenmann & Eigenmann, 1888: 143. Type locality: Gulf of Panama (Pacific), Panama. Holotype: MCZ 4972.

Distribution: Western Central America.

Countries: Hawaiian Is. in U.S.A, Costa Rica, Panama and Colombia.

Habitat: Marine and brackish waters.

Maximum size: 290 mm TL.

Material examined: FMNH 19143 (5 al, 216–242 mm TL) (1 c&s), Panama, canal zone, Panama Bay, Balboa; USNM 286481 (7 al, 162–233 mm TL) (1 c&s), Colombia, off Cape Manglares, south of Tumaco.

***Cathorops fuerthii* (Steindachner, 1877)**

Arius fuerthii Steindachner, 1877: 579. Type Locality: Panama (Pacific). Syntypes: MCZ 4943, 4973, 7691, NMW 50568.

Tachysurus liropus Bristol in Gilbert, 1897: 438. Type locality: San Juan Lagoon, near mouth of río Ahome, Sonora, Mexico. Syntypes: SU 324, USNM 47584.

Tachysurus evermanni Gilbert & Starks, 1904: 32, pl. 5 (fig. 10). Type locality: Panama Bay, eastern Pacific. Holotype: SU 6706.

Distribution: Western America.

Countries: Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Colombia and Ecuador.

Habitat: Marine, brackish and fresh waters.

Maximum size: 280 mm TL.

Material examined: USNM 79398 (12 al) (2 es), Panama, Panama Bay, Balboa, canal zone.

***Cathorops hypophthalmus* (Steindachner, 1877)**

(fig. 30)

Arius hypophthalmus Steindachner, 1877: 581. Type locality: Panama. Holotype: not found.

Tachysurus gulosus Eigenmann & Eigenmann, 1888: 146. Type locality: Panama. Syntypes: MCZ 4974.

Distribution: Western Central America.

Countries: Panama.

Habitat: Brackish and fresh waters.

Maximum size: 350 mm TL.

Material examined: USNM 293275 (2 al, 168–185 mm TL) (1 es), Panama, Darien prov., río Pirre ca 1/2 km above El Real (río Tuyra dr.).

***Cathorops mapale* Betancur-R & Acero, 2005**

Cathorops mapale Betancur-R & Acero, 2005: 47. Type locality: Colombia, Magdalena, Ciénaga Grande de Santa Marta.

Holotype: INVEMAR-PEC 5333. Paratypes: INVEMAR-PEC 277, 1584, 5730, 5733, 3654, 5197, 5501, 5732, 5731 and 5348, ICN-MHN 8244, 8245, 8246 and 8247.

Distribution: North South America.

Countries: Colombia and Venezuela.

Habitat: Brackish and freshwaters.

Maximum size: 306 mm TL.

Material examined: USNM 286396 (5 al), Colombia, Ciénaga Grande de Santa Marta; USNM 286398 (5 al), Colombia, Cga. la Virgen, 1.2 m; USNM 121206 (11 al), Venezuela, río los Pajardos, 3 km acima do lago Maracaibo.

***Cathorops melanopus* (Günther, 1864)**

Arius melanopus Günther, 1864: 172. Type locality: Río Motagua, Guatemala. Syntypes: BMNH 1865.4.29.51–53.

Distribution: Montagua River basin.

Countries: Guatemala.

Habitat: Only in freshwater.

Maximum size: 230 mm TL.

Material examined: AMNH 35241 (2 al, 113–140 mm TL), Guatemala, Izabal, río Motagua, near Finca.

***Cathorops multiradiatus* (Günther, 1864)**

Arius multiradiatus Günther, 1864: 173. Type locality: Río Bayano, Panama. Holotype: whereabouts unknown.

Tachysurus emmelane Gilbert in Jordan & Evermann, 1898: 2785. Type locality: Panama (Pacific). Holotype: SU 5818.

Tachysurus equatorialis Starks, 1906: 766, figs. 3–4. Type locality: Guayaquil, Ecuador. Holotype: USNM 53470.

Distribution: Western Central America.

Countries: Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Colombia and Ecuador.

Habitat: Marine and brackish waters.

Maximum size: 300 mm TL.

Material examined: USNM 286400 (3 al) (1 es), Colombia, off Cape Manglares, south of Tumaco; USNM 79408 (2 al), Panama, Panama Bay, Balboa, canal zone.

***Cathorops spixii* (Agassiz, 1829)**

Pimelodus spixii Agassiz in Spix & Agassiz, 1829: 19. Type locality: Equatorial Brazil. No types known.

Pimelodus albidus Spix & Agassiz, 1829: 19, pl. 7 (fig. 1). Type locality: not stated. No types known.

Distribution: Northeastern South America.

Countries: Guyana, Surinam, French Guiana and Brazil.

Habitat: Marine and brackish waters.

Maximum size: 300 mm TL.

Material examined: MZUSP 49345 (5 al) (1 e), Brazil, Pará, baía de Marajó; MZUSP 49363 (16 al) (2 e), Brazil, Sergipe, rio Sergipe; MZUSP 49353 (31 al) (2 e), Brazil, Rio de Janeiro, Pontal de Atafona; MZUSP 24487 (10 al), Brazil, Macaé, Portinha; MZUSP 23127 (232 al) (3 e), Brazil, Rio de Janeiro, baía da Ilha Grande; MZUSP 49362 (38 al) (2 e), Brazil, São Paulo, Santos; MZUSP 37240 (6 al) (2 e), Brazil, São Paulo, Cananéia; MZUSP 51706 (1e), Brazil, Paraná, praia de Pontal do Sul.

***Cathorops steindachneri* (Gilbert & Starks, 1904)**

Tachysurus steindachneri Gilbert & Starks, 1904: 29, Pl. 5 (fig. 9). Type locality: Panama (Pacific). Holotype: SU 7026. Paratypes: SU 7027.

Arius taylori Hildebrand, 1925: 250, fig. 10. Type locality: Río Lempa, San Marcos, El Salvador. Holotype: USNM 87224.

Distribution: Western Central America.

Countries: Guatemala, El Salvador, Nicaragua, Costa Rica and Panama.

Habitat: Marine, brackish and freshwaters.

Maximum size: 360 mm TL.

***Cathorops tuyra* (Meek & Hildebrand, 1923)**

Arius tuyra Meek & Hildebrand, 1923: 128, pl. 5. Type locality: Río Tuyra, mouth of río Yape, Darien, Panama (Pacific).

Holotype: USNM 79413. Paratypes: FMNH 26711–12, 26713–15, USNM 79 411–12, 79414.

Distribution: Western Central and South America.

Countries: Panama, Colombia and Ecuador.

Habitat: Marine, brackish and fresh waters.

Maximum size: 230 mm TL.

Material examined: USNM 286466 (9 al) (2 es), Panama, río Pirre, 3–5 miles above El Real, purchased (caught on line); USNM 292824 (5 al), Panama, río Uruseca, 2 miles above El Real.

Species *inquirendae*

Arius festae Boulenger, 1898: 5. Type locality: Narrangal, west Ecuador. Holotype: MZUT 1479.

Arius laticeps Günther, 1864: 171. Type locality: Trinidad Island; Guyana. Syntypes: BMNH 1863.6.18.8, Trinidad, BMNH 1976.2.25.1, Guyana.

Arius nuchalis Günther, 1864: 171. Type locality: Guyana. Syntypes: BMNH 1975.1.17.3–5.

Arius punctulatus Valenciennes in Cuvier & Valenciennes, 1840b: 108. Type locality: Buenos Aires, Argentina. Holotype: MNHN.

Arius variolosus Valenciennes in Cuvier & Valenciennes, 1840b: 107. Type locality: Cayenne, French Guyana. Holotype: MNHN 4169.

***Cephalocassis* Bleeker, 1858**

(fig. 36)

Cephalocassis Bleeker, 1858: 62, 98 and 246. Type species: *Arius melanocheir* Bleeker, 1852. Type by subsequent designation by Bleeker, 1862: 7. Gender: feminine.

Hemipimelodus Bleeker, 1858: 205 and 236. Type species: *Pimelodus borneensis* Bleeker, 1851. Type by subsequent designation by Bleeker, 1862: 8 and 1863: 92. Gender: masculine.

Diagnosis. The presence of one exclusive (1) and twelve (2 to 13) shared characters define and distinguishes *Cephalocassis* from all other ariid genera: (1) presence of a fenestra between supraoccipital, pterotic and sphenotic (fig. 37); (2) mesethmoid very thin at median portion (fig. 37) [shared with *Arius* (with the exception of *A. caelatus* and *A. madagascariensis*), *Cathorops*, *Cinetodus*, *Ketengus*, *Osteogeneiosus*, *Pachyula* and *Potamarius*]; (3) vomer anterior margin acute and very conspicuous [shared with *Amphiarius*, *Arius*, *Aspistor*, *Cinetodus*, *Potamarius*, *Osteogeneiosus*, *Plicofollis*, *Notarius* (with exception of *N. planiceps*), *Pachyula* and *Potamosilurus macrorhynchus*]; (4) bony bridge formed by frontals and lateral ethmoid having frontals as its major component (fig. 37) (shared with *Amphiarius*, *Cathorops* and *Hemiaris*); (5) contact face of transcapular process with basioccipital restricted and columnar [shared with *Arius* (with exception of *A. gagera*, *A. maculatus* and *A. manillensis*), *Batrachcephalus*, *Brustarius*, *Carlarius*, *Cinetodus*, *Cochlefelis*, *Galeichthys*, *Genidens*, *Hemiaris*, *Ketengus*, *Neoarius*, *Netuma*, *Osteogeneiosus*, *Pachyula*, *Plicofollis* (with excep-

tion of *P. platystomus*), *Potamarius*, *Potamosilurus* (with exception of *P. latirostris*) and *Sciades*]; (6) dentary teeth restricted to 2/3 of the mesial portion of the bone (shared with *Cryptarius* and *Genidens*); (7) premaxilla narrow, almost as long as wide (shared with *Cathorops*, *Cinetodus* and *Potamarius*); (8) metapterygoid 1.5 times longer than higher (fig. 38) [shared with *Cathorops* (with exception of *Cathorops dasycephalus*), *Cinetodus*, *Cryptarius*, *Pachyula*, *Plicofollis* and *Potamarius*]; (9) lower crest of hyomandibular absent (fig. 38) (shared with *Cathorops* and *Ketengus*); (10) anterior portion of second basibranchial cup shaped and moderately differentiated (shared with *Bagre*, *Batrachocephalus*, *Brustiarius*, *Cinetodus*, *Cochlefelis*, *Cryptarius*, *Galeichthys*, *Genidens*, *Neoarius*, *Pachyula*, *Potamarius* and *Potamosilurus latirostris*); (11) posterior portion of second basibranchial moderately long and thin [shared with *Arius* (with exception of *A. gagora* and *A. maculatus*), *Batrachocephalus*, *Cathorops*, *Notarius*, *Osteogeneiosus*, *Potamosilurus* (with exception of *P. latirostris*) and *Sciades*]; (12) accessory crest connecting transversal and median crests of neural spine of fourth vertebra present (shared with *Amphiarius*, *Aspistor* and *Notarius*); (13) base of adipose fin very long, as long as anal-fin base (shared with *Amphiarius*, *Aspistor*, *Cinetodus*, *Galeichthys*, *Hemiaris*, *Notarius* and *Pachyula*).



FIGURE 36. *Cephalocassis melanochir*, USNM 230311, 229 mm TL. Lateral view.

Supplementary external characters. Cephalic shield granulated, visible under the skin; lateral ethmoid and frontal limiting a wide fenestra very conspicuous under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital absent; posterior cranial fontanel well differentiated, large and oval; fenestra limited by supraoccipital, pterotic and sphenotic present; fossa limited by pterotic, supracleithrum and extrascapular present or absent; epioccipital not invading dorsal portion of cephalic shield; shape of occipital process varying considerably; anterior and median nuchal plates fused and indistinct forming a structure of semi-lunar aspect; tooth plates associated with vomer absent; accessory tooth plates present or absent, when present bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very long, as long as anal-fin base; lateral line bifurcated or not at caudal region, reaching base of upper and sometimes of lower caudal-fin lobes; cleithrum thin with second dorsal process located at its upper portion; posterior cleithral process short and distinct from second dorsal process of cleithrum.

Remarks. Examination of *Pimelodus borneensis* Bleeker, 1851, type-species of *Hemipimelodus* indicated that this genus is synonym of *Cephalocassis*. Since the two generic names were proposed simultaneously, we here consider *Cephalocassis* as the valid generic name. The inclusion of *C. bleekeri* (Popta, 1900) and *C. manillensis* (Valenciennes, 1840) is also tentative and based on a few external supplementary morphological characters from the literature and distribution of the species and needs confirmation.

Distribution and habitat. South and southeast Asia, freshwaters.

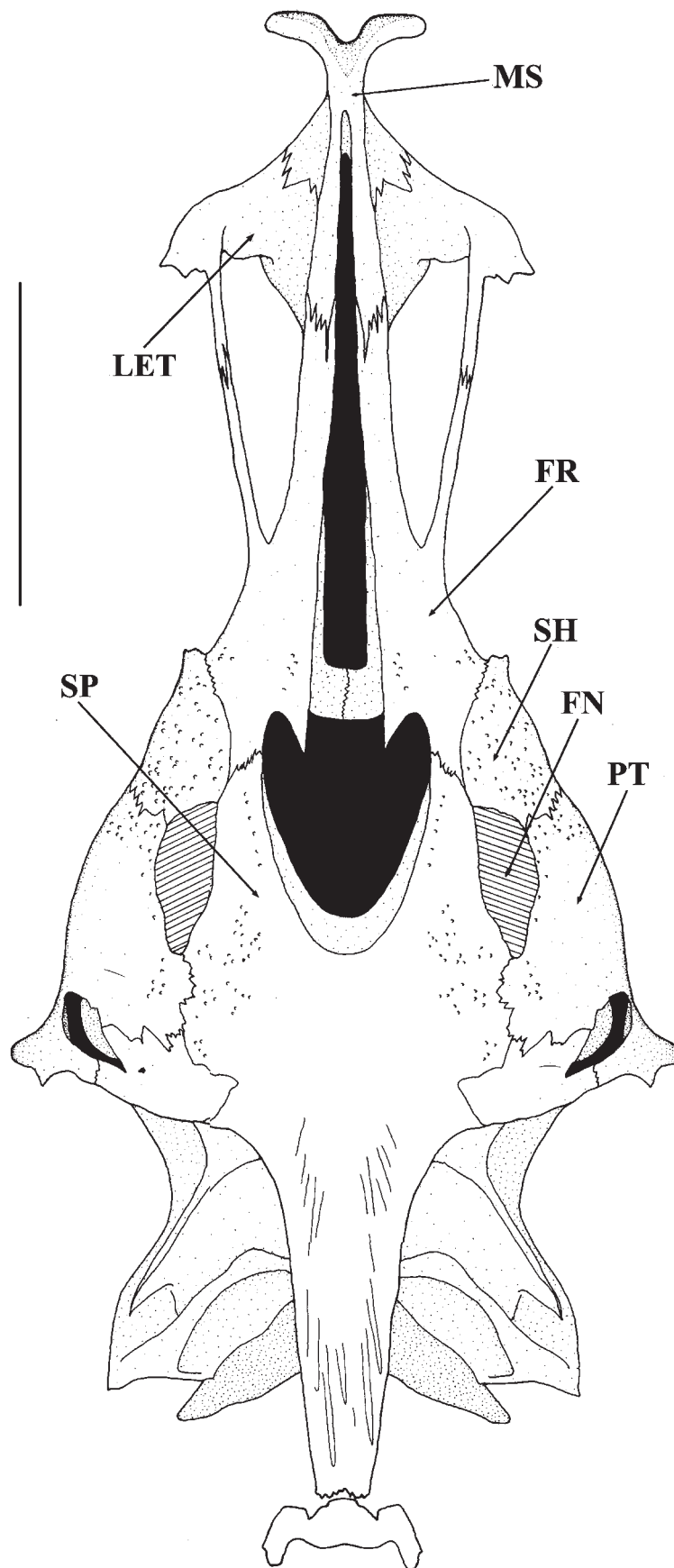


FIGURE 37. *Cephalocassis melanochir*, CAS 49426. Dorsal view of neurocranium. Scale bar = 10 mm. **FN** — fenestra; **FR** — frontal; **LET** — lateral ethmoid; **MS** — mesethmoid; **PT** — pterotic; **SH** — sphenotic; **SP** — supraoccipital.

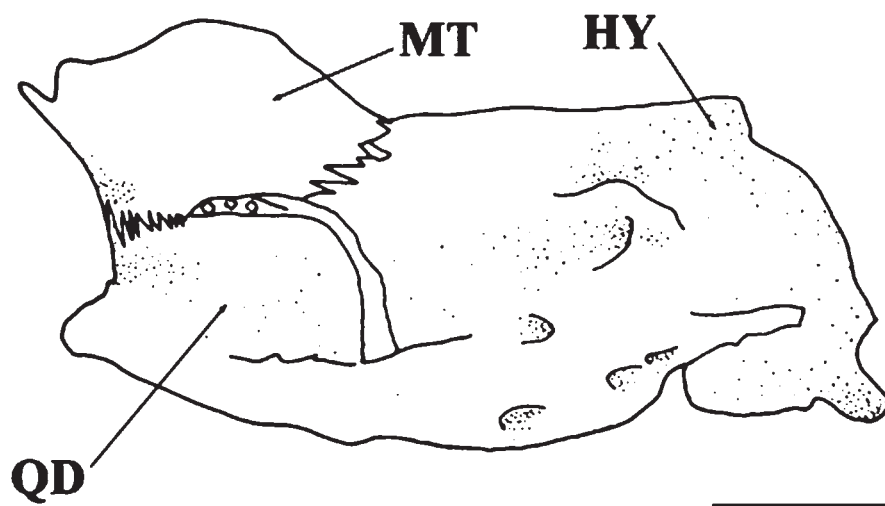


FIGURE 38. *Cephalocassis borneensis*, ANSP 87374. Lateral view of suspensorium. Scale bar = 4 mm. **HY** — hyomandibular; **MT** — metapterygoid; **QD** — quadrate.

***Cephalocassis bleekeri* (Popta, 1900)**

Arius bleekeri Popta, 1900: 71. Type locality: Malay Archipelago. Syntypes: RMNH 6825.

Distribution: South and southeast Asia

Countries: Indonesia and Malaysia.

Habitat: Brackish waters.

Maximum size: 170 mm TL.

***Cephalocassis borneensis* (Bleeker, 1851)**

Pimelodus borneensis Bleeker, 1851: 430. Type locality: Sambas, western Borneo, Indonesia. Holotype: RMNH 6906.

Hemipimelodus macrocephalus Bleeker, 1858: 239. Type locality: Banjarmasin, Borneo, Indonesia. Syntypes: BMNH 1863.12.4.116, RMNH 27618.

Hemipimelodus siamensis Sauvage, 1878: 234. Type locality: Laos. Holotype: MNHN 9649.

?*Hemipimelodus intermedius* Vinciguerra, 1881: 178. Type locality: Sarawak state, Borneo, East Malaysia. Syntypes: MSNG 14529.

Distribution: South and southeast Asia.

Countries: Thailand, Malaysia, Cambodia, Laos, Vietnam and Indonesia.

Habitat: Freshwaters.

Maximum size: 250 mm TL.

Material examined: ANSP 87374 (2 al, 130–144 mm TL) (1 c&s), Thailand, Bangkok, Siam; UMMZ 181201 (4 al, 165–186 mm TL) (1 c&s), Cambodia, Mekong River, 15 km north of Phnom Penh.

***Cephalocassis manillensis* (Valenciennes, 1840)**

Pimelodus manillensis Valenciennes in Cuvier & Valenciennes, 1840b: 192. Type locality: Manila, Philippines. Holotype: MNHN 1209.

Distribution: Southeast Asia.

Countries: Philippines.

Habitat: Brackish and fresh waters.

Maximum size: 260 mm TL.

***Cephalocassis melanochir* (Bleeker, 1852)**

(fig. 36)

Arius melanochir Bleeker, 1852: 590. Type locality: Palembang, Sumatra, Indonesia. Holotype: RMNH 6892.

Arius doriae Vinciguerra, 1881: 174. Type locality: Sarawak state, Borneo, east Malaysia. Syntypes: MSNG 8135, RMNH 10889.

Distribution: Southeast Asia.

Countries: Indonesia and Malaysia.

Habitat: Freshwaters

Maximum size: 300 mm TL.

Material examined: CAS 49426 (3 al, 185–236 mm TL) (1 c&s), Indonesia, Borneo, Kalimantan Barat, fish market at Sintang (purchased); USNM 230311 (2 al, 228–312 mm TL), Indonesia, Borneo, Sintang market, Purchase.

Species inquirendae

Hemipimelodus sundanensis Hardenberg, 1948: 411. Type locality: Kota Agung. Sunda Strait, Sumatra, Indonesia.

***Cinetodus* Ogilby, 1898**

(fig. 39)

Cinetodus Ogilby, 1898: 32. Type species: *Arius froggatti* Ramsay & Ogilby, 1886. Type by original designation and also monotypy. Gender: masculine.

Septobranchus Hardenberg, 1941: 223. Type species: *Septobranchus johannae* Hardenberg, 1941. Type by monotypy. Gender: masculine.

Diagnosis. Distinguished from the remaining ariid genera by the following exclusive (1 and 2) and shared (3 to 7) characters: (1) pharyngeal tooth plates round; (2) dorsal processes of pharyngeal tooth plates very short; (3) orbitosphenoid without lateral projection [shared with *Arius*, *Brustiarius*, *Carlarius*, *Genidens*, *Netuma*, *Notarius planiceps*, *Plicofollis* (with exception of *P. platystomus*), *Potamosilurus* (with exception of *P. latirostris*) and *Sciades* (with exception of *S. couma*, *S. emphysetus*, *S. passany*, *S. proops*, *S. seemanni* and *S. sagor*)]; (4) wing-like process of parasphenoid short and wide, leaf-like [shared with *Arius caelatus*, *A. madagascariensis*, *Brustiarius*, *Carlarius*, *Cathorops dasycephalus*, *Galeichthys*, *Genidens*, *Neoarius*, *Netuma*, *Notarius planiceps*, *Plicofollis platystomus*, *Potamosilurus velutinus* and *Sciades* (with exception of *S. emphysetus*, *S. passany* and *S. proops*)]; (5) posterior process of epioccipital contacting a small area of diagonal crest of neural spine of fourth vertebra (shared with *Amphiarius*, *Aspistor*, *Bagre*, *Cephalocassis melanochir*, *Cryptarius*, *Hemarius*, *Notarius*, *Potamarius izabalensis* and *Sciades platypogon*); (6) premaxillary narrower, almost as long as wide (shared with *Cathorops*, *Cephalocassis* and *Potamarius*); (7) anterior portion of opercle trapezoid shaped, long and narrow (shared with *Bagre*, *Galeichthys* and *Nedystoma*);

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal limiting a moderately developed fenestra evident under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital absent; posterior cranial fontanel moderately developed, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular present, relatively large; epioccipital invading dorsal portion of cephalic shield; occipital process progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; vomerine tooth plates absent; accessory tooth plates present bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very long, as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide with second dorsal process located at its upper portion; posterior cleithral process very long and distinct from second dorsal process of cleithrum.

Remarks. *Cinetodus* and *Septobranchus* have the same type-species *Arius froggatti* Ramsay & Ogilby, 1886, and must be recognized as objective synonyms. *C. carinatus* (Weber, 1913) was not examined and its inclusion in the genus was based on diagnostic features described in the literature and the results obtained by Kailola (1990a, 2004).

Distribution and habitat. Southern New Guinea and northern Australia, brackish and freshwaters.



FIGURE 39. *Cinetodus froggatti*, USNM 217080, 342 mm TL. Lateral view.

***Cinetodus carinatus* (Weber, 1913)**

Arius (*Hemiaris*) *carinatus* Weber, 1913: 537, figs. 13–14. Type locality: Lorentz River, New Guinea, Indonesia. Syntypes: AMNH 9265, ZMA 109295, ZMA 111109–12.

Distribution: Southern New Guinea.

Countries: Indonesia and Papua New Guinea.

Habitat: freshwater.

Maximum size: 520 mm SL.

***Cinetodus froggatti* (Ramsay & Ogilby, 1886)**

(fig. 39)

Arius froggatti Ramsay & Ogilby, 1886: 14. Type-locality: Strickland River, New Guinea. Holotype: AMS B.9936.

Septobranchus johannae Hardenberg, 1941: 223, fig. 3. Type locality: Merauke, Irian Jaya, Indonesia. Holotype: whereabouts unknown.

Distribution: Southern New Guinea and northern Australia.

Countries: Indonesia, Papua New Guinea and Australia.

Habitat: Brackish and freshwaters.

Maximum size: 520 mm TL.

Material examined: AMS I. 27417-001 (1 c&s), Papua New Guinea, gulf of Papua; USNM 217080 (3 al, 287–368 mm TL), Papua New Guinea, mainstream of lower fly 1.5 km upstream from Elangowan Island, 298 km upriver from Toro Pass.

***Cochlefelis* Whitley, 1941**

(fig. 40)

Cochlefelis Whitley, 1941: 8. Type species: *Arius spatula* Ramsay & Ogilby, 1866. Type by original designation. Gender: feminine.

Diagnosis. Eight shared characters distinguishes *Cochlefelis* from the remaining ariid genera: (1) fenestra delimited by lateral ethmoid and frontal bones very small or absent (shared with *Batrachcephalus*, *Netuma*, *Plicofollis* and *Sciades*); (2) medial groove of neurocranium little differentiated, its margins not well defined (shared with *Bagre*, *Galeichthys*, *Notarius planiceps*, *Sciades couma*, *S. herzbergii*, *S. guatemalensis*, *S. leptaspis* and *S. passany*); (3) anterior portion of opercle subtriangular (fig. 41) (shared with *Ketengus*, *Sciades emphysetus*, *S. passany* and *S. proops*); (4) anterior process of metapterygoid truncate [shared with *Cinetodus*, *Pachyula*, *Plicofollis*, *Potamarius* and *Potamosilurus* (with exception of *P. velutinus*)]; (5) wing-like process of parasphenoid formed by a single long and thin process [shared with *Amphiarus*, *Aspistor*, *Bagre*, *Cathorops* (with exception of *C. dasycephalus*), *Hemiarus*, *Notarius* (with exception of *N. planiceps*), *Pachyula*, *Plicofollis platystomus*, *Potamarius*, *Potamosilurus* (with exception of *P. velutinus*), *Sciades emphysetus*, *S. passany* and *S. proops*]; (6) third basibranchial in form of a long and thin hourglass (shared with *Galeichthys* and *Potamarius*); (7) mesial portion of fourth epibranchial not well differentiated (shared with *Galeichthys*); (8) more than 39 caudal vertebrae (shared with *Bagre*).



FIGURE 40. *Cochlefelis spatula*, Roberts, 1978. Lateral view.

Supplementary morphological characters. Cephalic shield scarcely granulated visible under the skin; lateral ethmoid and frontal limiting a very small fenestra little evident under the skin; medial groove of neurocranium not very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel moderately developed, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, moderately long and large, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; vomerine tooth plates round; accessory tooth plates transversely long and narrow, bearing conical teeth; maxillary barbels fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately

long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum broad with second dorsal process on its upper portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

Remarks. *C. dioctes* (Kailola, 2000) and *C. insidiator* (Kailola, 2000) have not been examined and their preliminary inclusion in the genus is based on the presence of external diagnostic features obtained from the literature.

Distribution and habitat. Southern New Guinea, brackish and fresh waters.

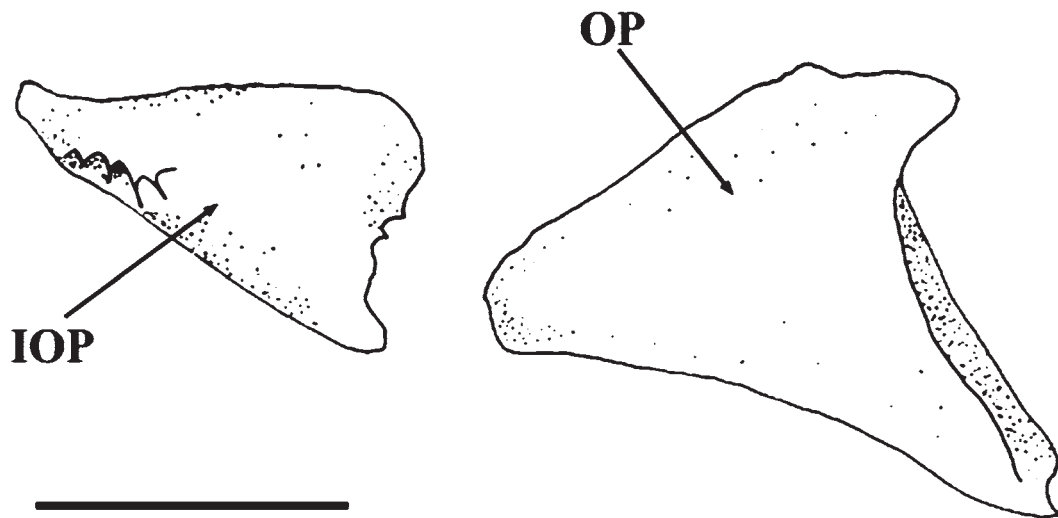


FIGURE 41. *Cochlefelis spatula*, AMS I.25997-002. Lateral view of interopercle and opercle. Scale bar = 4 mm. **IOP** — interopercle; **OP** — opercle.

Cochlefelis danielsi (Regan, 1908)

Arius (Hemiaris) danielsi Regan, 1908: 154. Type locality: Fly River, New Guinea. Holotype: BMNH 1905.8.15.21

Distribution: Southern New Guinea.

Countries: Papua New Guinea.

Habitat: Brackish and rarely fresh waters.

Maximum size: 550 mm TL.

Material examined: AMS I.26972-002 (2 c&s), Papua New Guinea, Kubiri Creek.

Cochlefelis dioctes (Kailola, 2000)

Arius dioctes Kailola, 2000: 128, figs. 1–2. Type locality: Norman River at Karumba. 17° 29' S, 140° 50' E, Queensland, Australia. Holotype: CSIRO C.3798. Paratypes: AMS I.15557-041, I.29292-001, CSIRO H.5154-01, NTM S.11190-001, S.14828-005.

Distribution: Southern New Guinea and northern Australia.

Countries: Papua New Guinea and Australia.

Habitat: Brackish and fresh waters.

Maximum size: 200 mm TL.

***Cochlefelis insidiator* (Kailola, 2000)**

Arius insidiator Kailola, 2000: 131, figs. 3–4. Type locality: Mouth of Wildman River, 12°26'S. 132°09'E, Northern Territory, Australia. Holotype: NTM S. 11189-001. Paratypes: AMS I.28960-001, KFRS F.03302, F.5526-01.

Distribution: Southern New Guinea and northern Australia.

Countries: Papua New Guinea and Australia.

Habitat: Marine and brackish waters.

Maximum size: 350 mm TL.

***Cochlefelis spatula* (Ramsay & Ogilby, 1886)**

(fig. 40)

Arius spatula Ramsay & Ogilby, 1886: 15. Type locality: Strickland River, New Guinea. Holotype: AMS B.9937

Arius (Hemiaris) nudidens Weber, 1913: 538, fig. 15. Type locality: Lorentz River, New Guinea. Syntypes: ZMA 111507-09.

Distribution: Southern New Guinea.

Countries: Indonesia and Papua New Guinea.

Habitat: freshwater

Maximum size: 640 mm TL.

Material examined: AMS I.25997-002 (1 c&s), Papua New Guinea, mid Purari River.

***Cryptarius* Kailola, 2004**

(fig. 42)

Cryptarius Kailola, 2004: 134. Type species: *Arius truncatus* Valenciennes, 1840. Type by original designation. Gender: masculine

Diagnosis. *Cryptarius* can be distinguished by the following exclusive (1 to 5) and shared (6 to 14) characters: (1) vomer arrow shaped; (2) epioccipital posterior process contacting median crest associated with neural spine of fourth vertebra; (3) anterior part of interopercle very long and pointed (fig. 43); (4) anterior part of metapterygoid contacting quadrate through an indented articulation, most of the remaining part of this bone simply contacting the quadrate (fig. 44); (5) posterior portion of second basibranchial very wide (fig. 45); (6) mesethmoid moderately thick at median portion (shared with *Amphiarius*, *Arius caelatus*, *A. madagascariensis*, *Aspistor*, *Galeichthys*, *Genidens*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Neoarius*, *Netuma*, *Notarius*, *Plicofollis*, *Potamosilurus*, *Sciades assimilis*, *S. bonillai*, *S. felis*, *S. platypogon*, *S. sagor* and *S. seemanni*); (7) anterior part of anterior cranial fontanel indistinct, not limited by a mesial expansion of orbitosphenoid (shared with *Galeichthys*, *Batrachocephalus*, *Cephalocassis*, *Doiichthys*, *Ketengus*, *Nedystoma* and *Nemapteryx*); (8) extrascapular subquadrangular [shared with *Amphiarius*, *Aspistor*, *Carlarius*, *Cephalocassis*, *Cochlefelis*, *Doiichthys*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Neoarius*, *Netuma*, *Notarius*, *Potamarius izabalensis*, *Potamosilurus* (with exception of *P. velutinus*) and *Sciades*]; (9) posterior projection of epioccipital process contacting a small portion of the diagonal crest associated with neural spine of fourth vertebra (shared with *Amphiarius*, *Aspistor*, *Bagre*, *Cephalocassis melanochir*, *Cinetodus*, *Hemiaris*, *Notarius*, *Potamarius izabalensis* and *Sciades platypogon*); (10) ventral crest of occipital process restricted to its base [shared with *Arius*, *Batrachocephalus*, *Brustarius*, *Carlarius*, *Cochlefelis*, *Doiichthys*, *Galeichthys*, *Genidens*, *Ketengus*, *Neoarius*, *Netuma*, *Notarius*, *Osteogeneiosus*, *Plicofollis*, *Potamarius*, *Potamosilurus* and *Sciades* (with

exception of *S. platypogon*]; (11) wing-like process of parasphenoid absent (shared with *Batrachocephalus*, *Cephalocassis*, *Doiichthys*, *Ketengus*, *Nedystoma*, *Nemapteryx*, *Osteogeneiosus* and *Potamarius*); (12) lateral processes of urohyal long (shared with *Amphiarius*, *Arius*, *Aspistor*, *Bagre*, *Brustarius*, *Carlarius*, *Cephalocassis melanochir*, *Cochlefelis*, *Doiichthys*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Neoarius*, *Netuma*, *Notarius*, *Plicofollis platystomus*, *Potamarius*, *Potamosilurus* and *Sciades*); (13) urohyal lateral processes almost as long as medial process (shared with *Amphiarius*, *Brustarius*, *Carlarius*, *Cephalocassis melanochir*, *Cochlefelis*, *Galeichthys*, *Hemiaris*, *Neoarius*, *Netuma bilineatus*, *Notarius*, *Potamosilurus* and *Sciades*); (14) crest associated with neural spine of third vertebra only slightly developed [shared with *Arius*, *Batrachocephalus*, *Brustarius*, *Carlarius*, *Cochlefelis*, *Doiichthys*, *Galeichthys*, *Genidens*, *Ketengus*, *Neoarius*, *Netuma*, *Notarius*, *Osteogeneiosus*, *Plicofollis*, *Potamarius*, *Potamosilurus* and *Sciades* (with exception of *S. platypogon*)].

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal bones limiting a large fenestra clearly visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel moderately developed, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular very reduced; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, moderately long and wide, narrowing progressively toward its posterior end; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer absent; accessory tooth plates small transversely elongated and oval shaped, bearing conical teeth; maxillary barbels fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very short, less than one-half the length of anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum narrow, with second dorsal process on its upper portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

Remarks. No specimen of *C. daugueti* (Chevey, 1932) could be obtained for examination and data from descriptions available in the literature do not contain reliable information as to inclusion of the species into any of the genera we recognize. Thus, the inclusion of *C. daugueti* in *Cryptarius* is preliminary and based on Kailola's (2004) results.

Distribution and habitat. South and southeast Asia, brackish waters.



FIGURE 42. *Cryptarius truncatus*, ANSP 60768, 168 mm TL. Lateral view.

***Cryptarius daugueti* (Chevey, 1932)**

Hemipimelodus daugueti Chevey, 1932: 41, pl. 13. Type locality: Indo-China. Holotype: Indochine, Nhatrang, Vietnam.

Distribution: South and southeast Asia.

Countries: Cambodia, Vietnam.

Habitat: Brackish and fresh waters.

Maximum size: 260 mm TL.

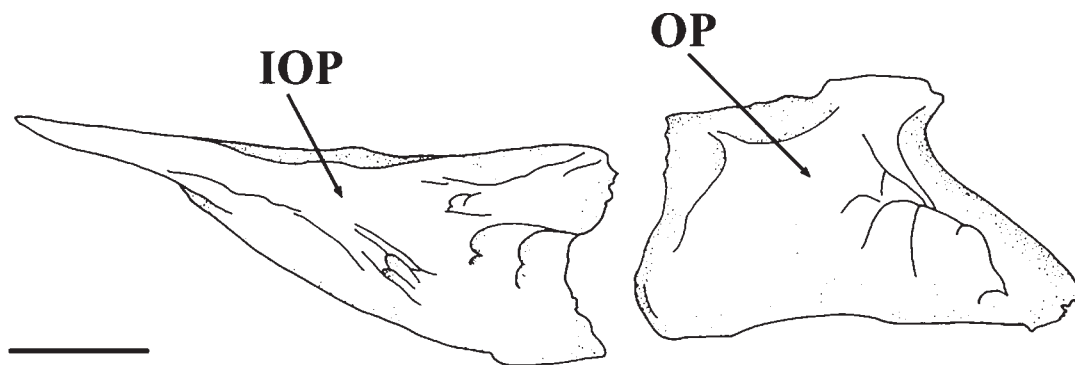


FIGURE 43. *Cryptarius truncatus*, ANSP 60768. Lateral view of interopercle and opercle. Scale bar = 4 mm. **IOP** — interopercle; **OP** — opercle.

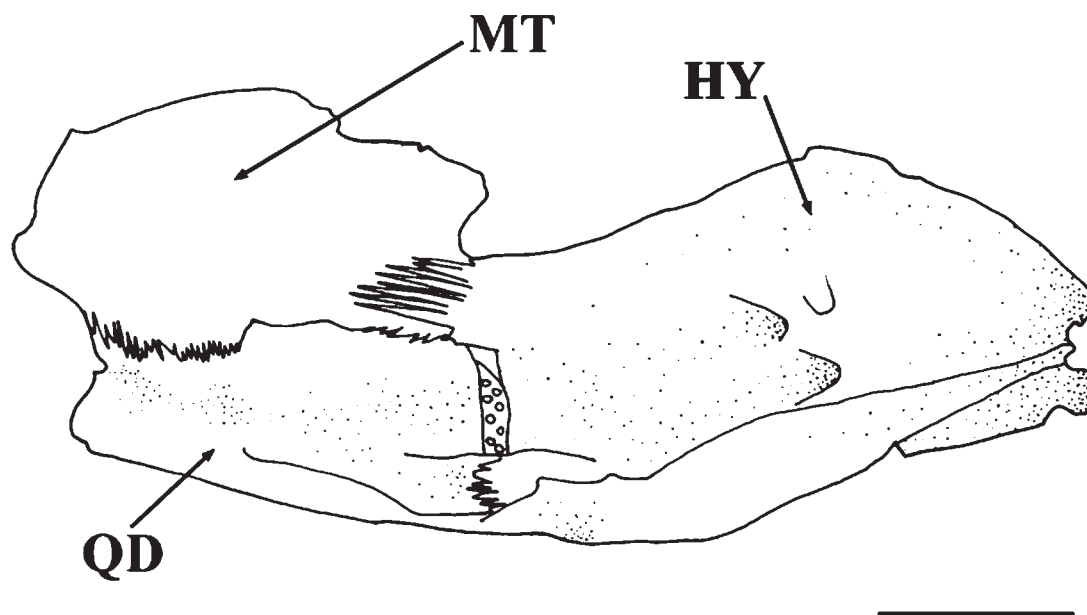


FIGURE 44. *Cryptarius truncatus*, ANSP 60768. Lateral view of suspensorium. Scale bar = 4 mm. **HY** — hyomandibular; **MT** — metapterygoid; **QD** — quadrate.

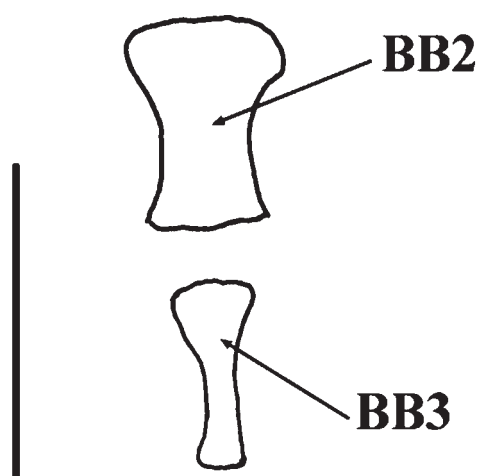


FIGURE 45. *Cryptarius truncatus*, ANSP 60768. Dorsal view of second and third basibranchials. Scale bar = 4 mm. **BB2** — second basibranchial; **BB3** — third basibranchial.

***Cryptarius truncatus* (Valenciennes, 1840)**

(fig. 42)

Arius truncatus Valenciennes in Cuvier & Valenciennes, 1840b: 64. Type locality: Java, Indonesia. Holotype: MNHN B-0590.

Hemipimelodus cochlearis Fowler, 1935: 101, fig. 25. Type locality: Paknam, Thailand. Holotype: ANSP 60767. Paratypes: ANSP 60768-73.

Distribution: South and southeast Asia.

Countries: Thailand, Cambodia, Indonesia and Malaysia.

Habitat: Brackish waters.

Maximum size: 420 mm TL.

Material examined: ANSP 60768 (3 al, 166–190 mm TL) (1 c&s), Thailand, Paknam, Siam, at the mouth of the Me Nam Chao Phya, south of Bangkok; UMMZ 181176 (4 al, 227–290 mm TL) (1 c&s), Cambodia, Battambang, Tonle Sap (Great Lake) NW basin, Mekong dr; USNM 103189 (2 al, 246–283 mm TL), Thailand, Menam Chao Phya, Koh yYai, c. Siam.

***Doiichthys* Weber, 1913**

Doiichthys Weber, 1913: 532. Type species: *Doiichthys novaeguineae* Weber, 1913. Type by monotypy. Gender: masculine.

Diagnosis. *Doiichthys* can be differentiated from all other ariid genera by an extensive list of exclusive (1 to 10) and shared (11 to 21) characters: (1) nasal irregularly shaped; (2) presence of five infraorbitals; (3) premaxillary very wide its length more than 4 times in its width; (4) ceratohyal very long (fig. 46); (5) epihyal unusually long (fig. 46); (6) urohyal medial process very long (fig. 47); (7) first and second epibranchials straight for entire length (fig. 48); (8) first pharyngobranchial located at end of first epibranchial (fig. 48); (9) pharyngeal tooth plates long and narrow (fig. 49); (10) mesial portion of first epibranchial very compressed and wide (fig. 48); (11) mesethmoid medial notch allege and shallow (fig. 50) (shared with *Bagre*, *Cinetodus*, *Cryptarius*, *Galeichthys*, *Ketengus* and *Pachyula*); (12) mesethmoid unusually very large at median portion (fig. 50) (shared with *Bagre*, *Batrachocephalus*, *Brustiarius*, *Carlarius*, *Cochlefelis*, *Sciades couma*, *S. emphysetus*, *S. guatemalensis*, *S. herzbergii*, *S. leptaspis*, *S. passany* and *S. proops*); (13) lateral horn of lateral ethmoid very long and posteriorly directed [shared with *Arius* (with the exception of *Arius caelatus*), *Plicofollis* (with exception of *P. platystomus* and *P. tenuispinis*) and *Potamarius*]; (14) lower crest of occipital process restricted to base of process [shared with *Arius*, *Batrachocephalus*, *Brustiarius*, *Carlarius*, *Cochlefelis*, *Cryptarius*, *Galeichthys*, *Genidens*, *Ketengus*, *Neoarius*, *Netuma*, *Notarius*, *Osteogeneiosus*, *Plicofollis*, *Potamarius*,

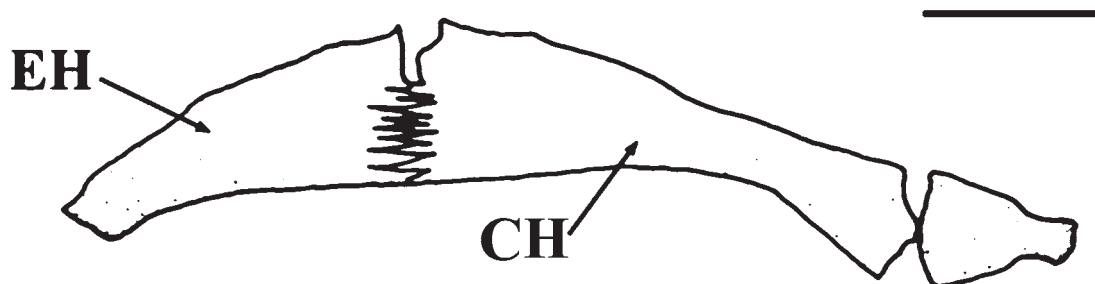


FIGURE 46. *Doiichthys novaeguineae*, AMS I.27416—002. Dorsal view of hyoid arch. Scale bar = 4 mm. **CH** — ceratohyal; **EH** — epihyal.

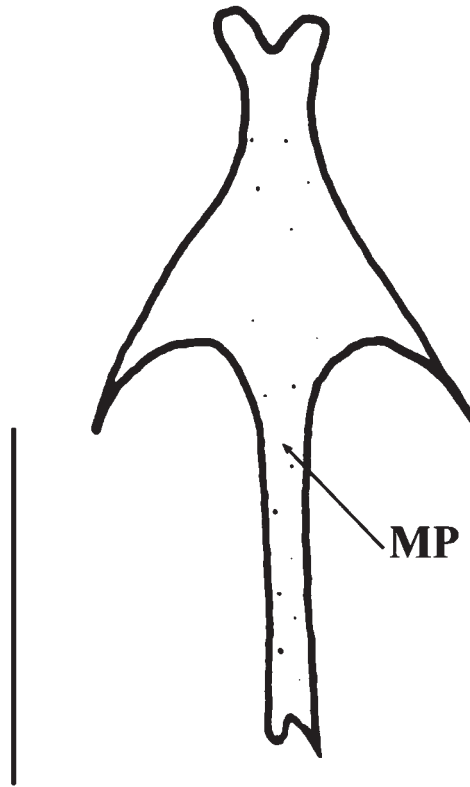


FIGURE 47. *Doiichthys novaeguineae*, AMS I.27416—002. Ventral view of urohyal. Scale bar = 4 mm. **MP** — medial process.

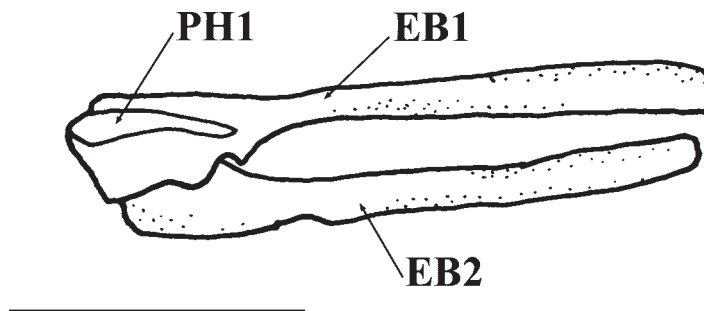


FIGURE 48. *Doiichthys novaeguineae*, AMS I. 27416-002. Dorsal view of first and second epibranchials and first pharyngobranchial. Scale bar = 4 mm. **EB1** — first epibranchial; **EB2** — second epibranchial; **PH1** — first pharyngobranchial.

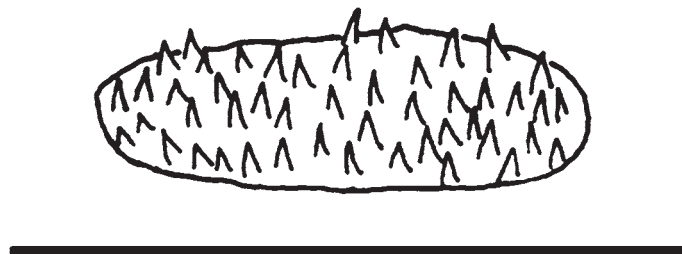


FIGURE 49. *Doiichthys novaeguineae*, AMS I. 27416-002. Ventral view of pharyngeal tooth plate. Scale bar = 4 mm.

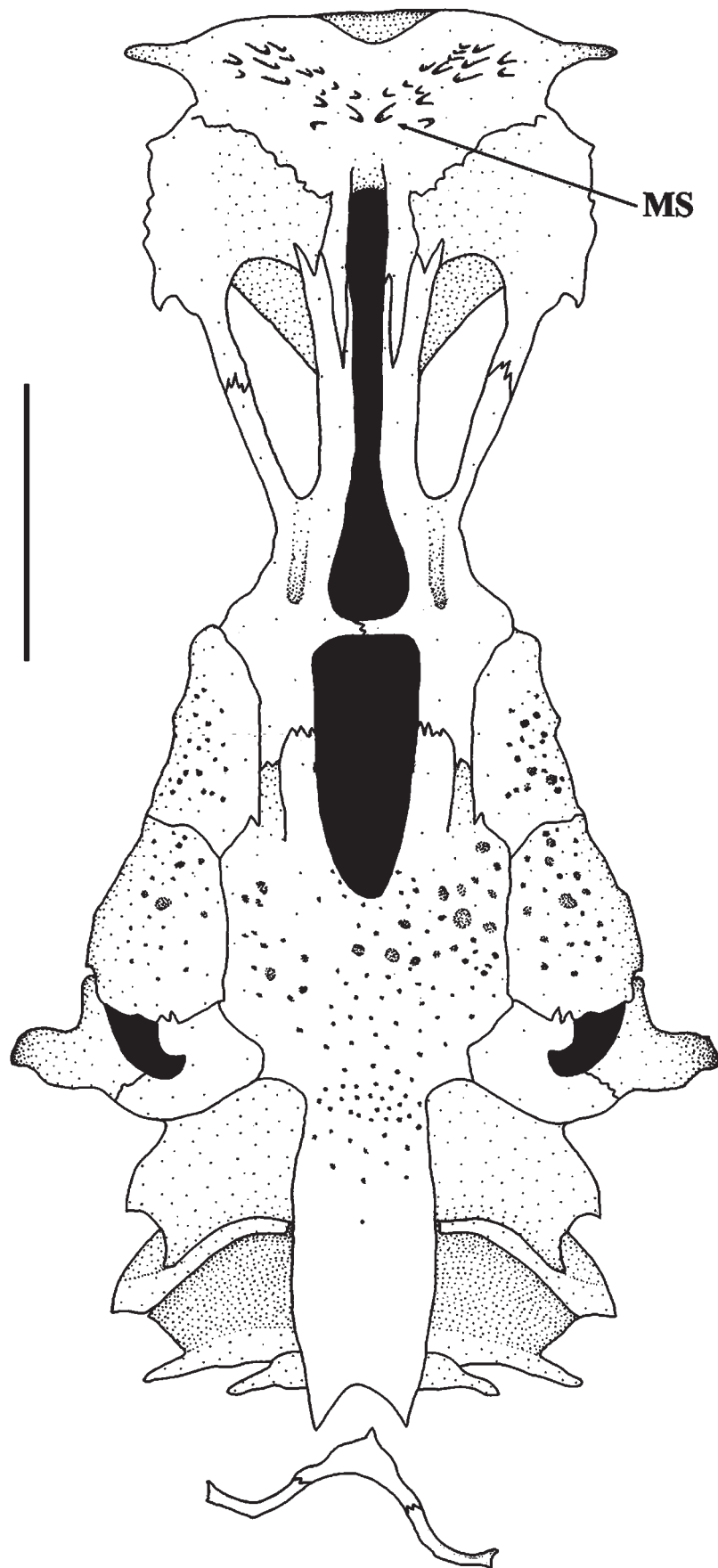


FIGURE 50. *Doiichthys novaeguineae*, AMS I.27416-002. Dorsal view of neurocranium. Scale bar = 10 mm. **MS** — mesethmoid.

Potamosilurus and *Sciades* (with the exception of *S. platypogon*); (15) face for articulation between palatine and lateral ethmoid on anterior portion of former bone (shared with *Bagre*); (16) metapterygoid twice as high as long (shared with *Bagre* and *Galeichthys*); (17) first external branchiostegal ray thin at proximal portion [shared with *Arius caelatus*, *Bagre*, *Batrachocephalus*, *Brustiarius*, *Carlarius*, *Cochlefelis*, *Galeichthys*, *Ketengus*, *Neoarius*, *Netuma*, *Notarius* (with exception of *N. planiceps*), *Osteogeneiosus*, *Sciades emphysetus*, *S. passany* and *S. proops*]; (18) second external branchiostegal ray less than half width of first ray (shared with *Amphiarius*, *Arius*, *Aspistor*, *Bagre*, *Brustiarius*, *Carlarius*, *Cinetodus*, *Cochlefelis*, *Genidens*, *Hemiaris*, *Nemapteryx*, *Neoarius*, *Netuma*, *Notarius*, *Osteogeneiosus*, *Pachyula*, *Plicofollis*, *Potamarius*, *Potamosilurus* and *Sciades*); (19) tip of urohyal medial process bifid (fig. 47) (shared with *Bagre*); (20) third pharyngobranchial mesially not angulated, shaped like an hourglass (shared with *Ketengus* and *Potamarius grandoculis*); (21) crest associated with neural spine of third vertebra weakly developed [shared with *Arius*, *Batrachocephalus*, *Brustiarius*, *Carlarius*, *Cochlefelis*, *Cryptarius*, *Galeichthys*, *Genidens*, *Ketengus*, *Neoarius*, *Netuma*, *Notarius*, *Osteogeneiosus*, *Plicofollis*, *Potamarius*, *Potamosilurus* and *Sciades* (with exception of *S. platypogon*)].

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal limiting a very conspicuous large fenestra visible under the skin; medial groove of neurocranium limited by frontals and/or on supraoccipital absent; posterior cranial fontanel well differentiated, very large and oval shaped; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, very long and narrow, narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; vomerine tooth plates absent; accessory tooth plates small, vertically elongate, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum narrow, second dorsal process located on its upper portion; posterior cleithral process short and distinct from second dorsal process of cleithrum.

Distribution and habitat. Southern New Guinea, brackish waters.

***Doiichthys novaeguineae* Weber, 1913**

Doiichthys novaeguineae Weber, 1913: 534, fig. 12. Type locality: Varen River, a trib. of Lorentz River, south New Guinea. Syntypes: AMNH 9482, ZMA 104122.

Distribution: Southern New Guinea.

Countries: Indonesia and Papua New Guinea.

Habitat: Brackish waters.

Maximum size: 150 mm SL.

Material examined: AMS I.27416-002 (1 c&s), Papua New Guinea, Era River.

***Galeichthys Valenciennes, 1840* (fig. 51)**

Galeichthys Valenciennes in Cuvier & Valenciennes, 1840b: 28. Type species: *Galeichthys feliceps Valenciennes, 1840*. Type by subsequent designation by Bleeker (1863). Gender: masculine.

Diagnosis. Distinct from the remaining ariid genera by the following exclusive (1 to 7) and shared (8 to 14)

characters: (1) distal 1/3 of maxillary conspicuously acute, lateral margins of this bone parallel along proximal two thirds; (2) anguloarticular with a dorsal process; (3) first pharyngobranchial absent; (4) posterior portion of second basibranchial long and wide (fig. 52); (5) mesial part of first epibranchial very wide and compressed; (6) space for insertion of teeth on fifth ceratobranchial very wide; (7) posterior cleithral process indistinct, attached to second dorsal process of cleithrum by a bony blade (fig. 53); (8) mesial laminar projection of frontal bones absent (fig. 1) (shared with *Amphiarius*, *Arius*, *Aspistor*, *Cathorops*, *Cephalocassis*, *Cryptarius*, *Doiichthys*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Osteogeneiosus*, *Potamarius* and *Potamosilurus latirostris*); (9) posterior branch of lachrymal short and mesially directed (fig. 3) (shared with *Sciades proops*); (10) occipital process long and narrow along its entire length (fig. 1) (shared with *Cephalocassis melanochir*, *Doiichthys* and *Nedystoma*); (11) transcapular process transversal to the main body axis (shared with *Amphiarius*, *Aspistor*, *Cathorops*, *Cinetodus*, *Cryptarius*, *Nemapteryx*, *Notarius* and *Pachyula*); (12) posteroventral portion of opercle little pronounced posteriorly [shared with *Bagre panamensis*, *Carlarius* (with exception of *C. heudelotii*), *Genidens*, *Ketengus*, *Plicofollis* (with exception of *P. platystomus*) and *Sciades* (with exception of *S. couma* and *S. felis*)]; (13) second external branchiostegal ray almost as wide as first (shared with *Batrachocephalus*, *Cathorops*, *Cephalocassis*, *Cryptarius*, *Ketengus* and *Nedystoma*); (14) third basibranchial in form of a long and narrow hourglass (fig. 52) (shared with *Cochlefelis* and *Potamarius*).



FIGURE 51. *Galeichthys feliceps*, MZUSP 87694, 283 mm TL. Lateral view.

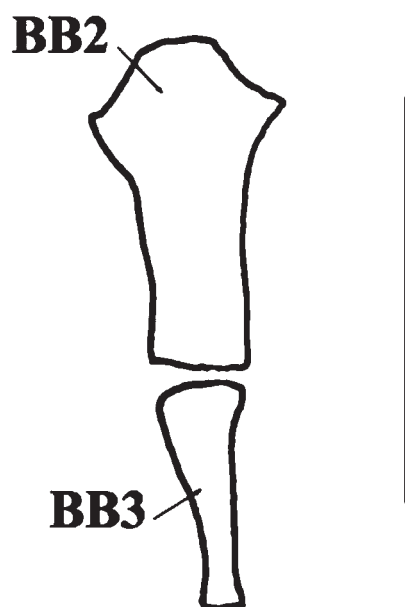


FIGURE 52. *Galeichthys feliceps*, MZUSP 87694. Dorsal view of second and third basibranchials. Scale bar = 4 mm. BB2 — second basibranchial; BB3 — third basibranchial.

Supplementary morphological characters. Cephalic shield smooth, covered by muscle and scarcely visible under the skin; lateral ethmoid and frontal limiting a moderately developed fenestra evident under the

skin; medial groove of neurocranium not very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel very reduced in young, partially closed in adult specimens; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular very reduced; epioccipital not invading dorsal portion of cephalic shield; occipital process long and narrow as broad at base as at posterior part; anterior and median nuchal plates free and distinct, forming a structure of semi-lunar aspect; vomerine tooth plates present and transversely elongate; accessory tooth plates narrow and transversely elongate, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very long, as long as base of anal-fin base; lateral line not bifurcated at the caudal region, not reaching base of caudal-fin lobes; cleithrum large; posterior cleithral process indistinct, attached to second dorsal process of cleithrum by a bony blade.

Remarks. Cleared and stained specimens of *G. peruvianus* Lütken, 1874 were not examined and its inclusion in the genus was based solely on observation of morphological external characters.

Distribution and habitat. Southern Africa and northwestern South America, predominantly marine species.

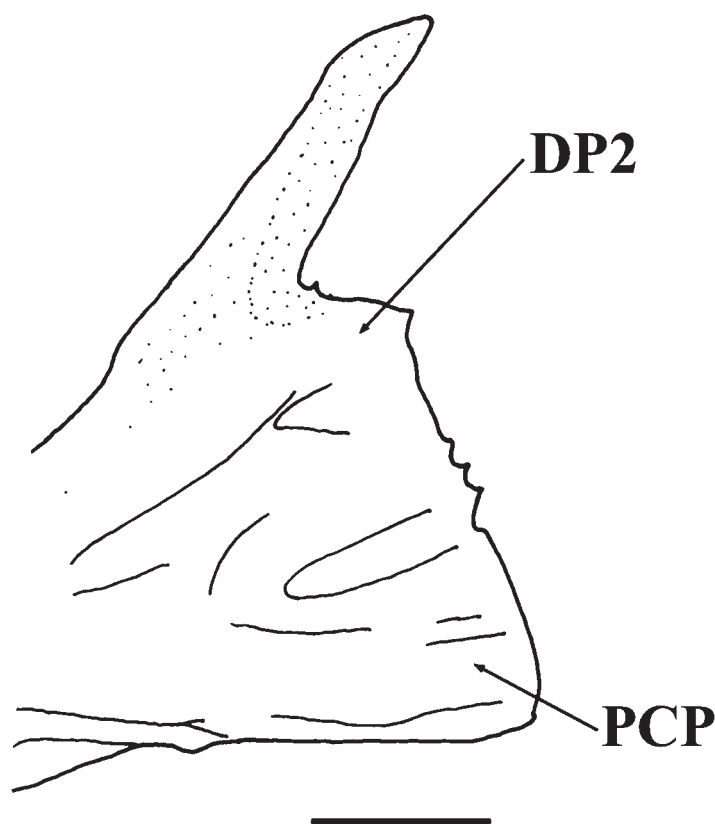


FIGURE 53. *Galeichthys feliceps*, MZUSP 87694. Lateral view of cleithrum. Scale bar = 4 mm. **DP2** — second dorsal process; **PCP** — posterior cleithral process.

Galeichthys ater Castelnau, 1861

Galeichthys ater Castelnau, 1861: 62. Type-locality: Cape of Good Hope, South Africa. No types known.

Distribution: Southern Africa.

Countries: South Africa.

Habitat: Predominantly marine waters.

Maximum size: 450 mm TL.

Material examined: MZUSP 87693 (1 al) (1 c&s), South Africa, Groot Bank.

***Galeichthys feliceps* Valenciennes, 1840**

(fig. 51)

?*Pimelodes fossor* Lichtenstein 1823: 112. Type locality: Cape of Good Hope, South Africa. No types known.

Galeichthys feliceps Valenciennes in Cuvier & Valenciennes, 1840b: 29, pl. 424. Type locality: vicinity of Cape of Good Hope, South Africa. Syntypes: MNHN A-9361 to A-9365.

Bagre capensis Smith, 1840: no pagination, pl. 8. Type-locality: Cape of Good Hope, South Africa. Syntypes: BMNH 1857.6.13.147.

Galeichthys ocellatus Gilchrist & Thompson, 1916: 60. Type-locality: Zwartkops R., Algoa Bay, South Africa. Holotype: PEM.

Distribution: Southern Africa.

Countries: South Africa.

Habitat: Predominantly marine waters.

Maximum size: 550 mm TL.

Material examined: AMNH 97276 (2 al), Angola, Walfish Bay, Namibia; MZUSP 87694 (1 al) (1 c&s), Namibia.

***Galeichthys peruvianus* Lütken, 1874**

Galeichthys peruvianus Lütken, 1874: 205. Type-locality: Callao, Peru. Syntypes: ZMUC 150, ZMUC 490.

Distribution: Northwestern South America.

Countries: Ecuador and Peru.

Habitat: Predominantly marine waters.

Maximum size: 350 mm TL.

Material examined: CAS 11962 (2 al), Peru, Callao, Callao Bay.

***Genidens* Castelnau, 1855**

(fig. 54)

Genidens Castelnau, 1855: 33. Type species: *Bagrus genidens* Valenciennes, 1840 (= *Pimelodus genidens* Cuvier, 1829). Type by absolute tautonymy. Gender: masculine.

Guiritinga Bleeker, 1858: 62 and 67. Type species: *Pimelodus commersonii* Lacépède, 1803. Type by monotypy. Gender: feminine.

Diagnosis. The combination of two unique (1 and 2) and eight shared (3 to 10) characters distinguishes the species of *Genidens* from all other genera of the Ariidae: (1) tooth plates associated with vomer movably attached to bone by ligamentous tissue (with exception of *G. genidens*); (2) lateral margins of orbitosphenoid converging anteroposteriorly; (3) posterior cranial fontanel reduced to a small opening [shared with *Bagre*, *Brustiarius*, *Cathorops* (with exception of *C. dasycephalus*), *Galeichthys*, *Netuma* and *Plicofollis* (with exception of *P. platystomus*)]; (4) temporal fossa very reduced or partially closed (shared with *Bagre panamensis*, *B. pinnimaculatus*, *Brustiarius*, *Cathorops*, *Cephalocassis borneensis*, *Cryptarius*, *Galeichthys* and *Netuma bilineatus*, *Sciades*); (5) proximal 2/3 of maxillary lateral margins parallel, distal 1/3 of bone narrower and

posterior part truncate (shared with *Carlarius heudelotii*, *Netuma thalassinus*, *Plicofollis* and *Sciades platypogon*); (6) dentary teeth restricted to mesial 2/3 of bone (shared with *Cephalocassis* and *Cryptarius*); (7) posteroventral portion of opercle little pronounced posteriorly [shared with *Bagre panamensis*, *Carlarius* (with exception of *C. heudelotii*), *Galeichthys*, *Ketengus*, *Plicofollis* (with exception of *P. platystomus*) and *Sciades* (with exception of *S. couma* and *S. felis*)]; (8) lateral processes of urohyal short (fig. 55) [shared with *Batrachcephalus*, *Cathorops*, *Cephalocassis borneensis*, *Cinetodus*, *Galeichthys*, *Ketengus*, *Osteogeneiosus*, *Pachyula* and *Plicofollis* (with exception of *P. platystomus*)]; (9) urohyal lateral processes half as long as medial process (shared with *Arius*, *Aspistor*, *Batrachcephalus*, *Cathorops*, *Cephalocassis borneensis*, *Cinetodus*, *Ketengus*, *Osteogeneiosus*, *Nedystoma*, *Nemapteryx*, *Netuma thalassinus* and *Pachyula*); (10) posterior portion of second basibranchial short (fig. 56) (shared with *Arius gagora*, *A. maculatus*, *Aspistor* and *Netuma*).



FIGURE 54. *Genidens genidens*, MZUSP 24366, 183 mm TL. Lateral view.

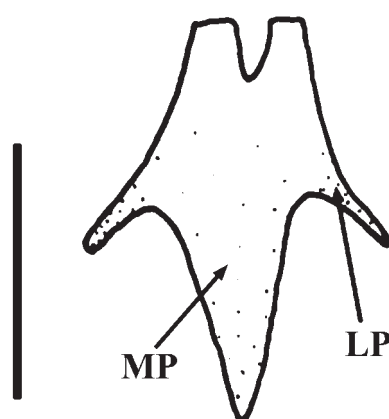


FIGURE 55. *Genidens barbatus*, MZUSP 24524. Ventral view of urohyal. Scale bar = 4 mm. LP — lateral process; MP — medial process.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal limiting a small fenestra scarcely visible under the skin; medial groove of neurocranium very distinct, limited by frontals and/or on supraoccipital; posterior cranial fontanel very reduced closing

completely with growth; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular very reduced; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular moderately long and wide, narrower at posterior end; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer round or absent; accessory tooth plates with shape highly variable, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide, with second dorsal process on its upper portion; posterior cleithral process of moderate size, distinct from second dorsal process of cleithrum.

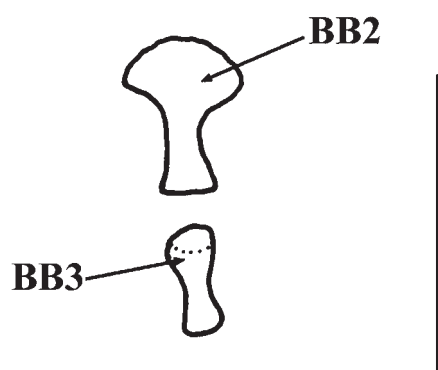


FIGURE 56. *Genidens barbatus* MZUSP 24524. Dorsal view of second and third basibranchials. Scale bar = 4 mm. **BB2** — second basibranchial; **BB3** — third basibranchial.

Remarks. The nominal genus *Guiritinga* is a junior synonym of *Genidens* based on the examination and analysis of its type-species *Pimelodus commersonii* Lacépède, 1803 (= *Pimelodus barbatus* Lacépède, 1803). *G. planifrons* (Higuchi *et al.*, 1982) was included on the basis of presence diagnostic external morphological features observed in specimens preserved in alcohol.

Distribution and habitat. Southeast of South America, marine and brackish waters.

Genidens barbatus (Lacépède, 1803)

Pimelodus barbatus Lacépède, 1803: 94 and 102. Type locality: Tropical America. No types known.

Pimelodus commersonii Lacépède, 1803: 95 and 103, pl. 3 (fig. 1). No locality. No types known.

Bagrus barbatus Quoy & Gaimard, 1824: 230, pl. 49 (fig.1–2). Type locality: Río de La Plata, South America. No types known.

Pimelodus versicolor Castelnau, 1855: 35, pl. 16 (fig. 3). Type locality: Rio Araguay, Goiás, Brazil. Syntypes: MNHN 1206.

Tachisurus upsulonophorus Eigenmann & Eigenmann, 1889: 31. Type locality: Rio Grande do Sul, Brazil. Holotype: MCZ 23750.

Silurus marinus Larrañaga, 1923: 376. Type locality: Uruguay. No types known.

Silurus sexdecimradiatus Larrañaga, 1923: 386. Type locality: Uruguay. No types known.

Distribution: Southeast of South America.

Countries: Brazil, Uruguay and Argentina.

Habitat: Predominantly marine but also in brackish waters.

Maximum size: 1.200 mm TL.

Material examined: MZUSP 22780 (1 c&s), Brazil, Rio de Janeiro, Pontal de Atafona; MZUSP 24524 (5 al) (1 c&s), Brazil, São Paulo, Ubatuba, praia Dura, mouth of rio Escuro; MZUSP 51702 (1 es), Brazil, São

Paulo, Juréia; MZUSP 51703 (1 es), Brazil, São Paulo, Bertioga, 6 miles from coast; MZUSP 51704 (3 es), Brazil, coast of São Paulo state; MZUSP 28275 (1 al), Brazil, Rio de Janeiro, Itaguaí, mouth of rio da Guarda.

***Genidens genidens* (Cuvier, 1829)**

(fig. 54)

Pimelodus genidens Cuvier, 1829: 294. Type locality: not stated. Syntypes: MNHN 1213, MNHN B-0678.

Genidens granulosus Castelnau, 1855: 34. pl. 16(fig. 1). Type locality: Rio Araguay, Goiás, Brazil. Holotype: MNHN 1197.

Genidens cuvieri Castelnau, 1855: 34. Type locality: Rio de La Plata. No types known.

Genidens valenciennesi Bleeker, 1858: 68. Type locality: Rio de Janeiro, Brazil; Argentina. Syntypes: MNHN 1213, Rio de Janeiro, MNHN B-0678, rio de La Plata.

Distribution: Southeast of South America.

Countries: Brazil, Uruguay and Argentina.

Habitat: Marine and brackish waters.

Maximum size: 350 mm TL.

Material examined: MZUSP 49319 (12 al) (1 c&s), Brazil, São Paulo, Cananéia; MZUSP 51721 (5 al) (1 c&s), Brazil, Bahia, rio Peruípe, port of Viçosa; MZUSP 51692 (4 es), Brazil, coast of São Paulo state; MZUSP 51694 (1 es), Brazil, São Paulo, Juréia; MZUSP 51693 (2 es), Brazil, São Paulo, between ilha de Bom Abrigo and Juréia, 16 miles from coast; MZUSP 51691 (1 es), Brazil, São Paulo, Bertioga, 6 miles from coast; MZUSP 24366 (5 al), Brazil, São Paulo, Cananéia.

***Genidens machadoi* (Miranda-Ribeiro, 1918)**

Tachysurus machadoi Miranda-Ribeiro, 1918: 110. Type locality: Macaé, Rio de Janeiro, Brazil. Holotype: MNRJ 6612.

Distribution: Southeast of South America.

Countries: Brazil, Uruguay, Argentina and Chile.

Habitat: Entirely marine waters.

Maximum size: 840 mm TL.

Material examined: MZUSP 24398 (18 al) (1 c&s), Brazil, 32°28'S–52°15'N; MZUSP 51698 (1 es), Brazil, São Paulo, Juréia; MZUSP 51699 (1 es), Brazil, São Paulo, Juréia; MZUSP 51700 (1 es), Brazil, São Paulo, Bertioga; MZUSP 51701 (3 es), Brazil, coast of São Paulo state; MZUSP 24417 (1 al), Brazil, 29°43'S–49°55'W.

***Genidens planifrons* (Higuchi, Reis & Araújo, 1982)**

Netuma planifrons Higuchi, Reis & Araújo, 1982: 12, fig. 1. Type locality: Lagoa dos Patos, RS, Brazil. Holotype: MZUSP 14828. Paratypes: AMNH 48875; ANSP 149293-94; CAS 50701; FMNH 94701; MCZ 58691; MOFURG 80.155-157; MZUSP 14822-25, 14826-27, 148229, 14834-35; NMC 82-061; UF 32871; USNM 233896, 233897.

Distribution: Southeast of South America.

Countries: Brazil

Habitat: Mostly brackish waters.

Maximum size: 570 mm TL.

Material examined: MZUSP 15990 (1 al), Brazil, Rio Grande do Sul, canal of access to Lagoa dos Patos.

Species *inquirendae*

Arius nigricans Valenciennes, 1834: no p., pl. 3 (fig. 3). Type locality: Rio de La Plata, Montevideo, Uruguay. Holotype: MNHN 0176.

Hemiaris Bleeker, 1862

(fig. 57)

Hemiaris Bleeker, 1862: 7, 29. Type species: *Cephalocassis stormii* Bleeker, 1858. Type by original designation. Gender: masculine.

Diagnosis. *Hemiaris* can be distinguished from the remaining ariid genera by the combination of six characters shared with species of other genera of the family: (1) vomerine tooth plates present [shared with *Aspistor*, *Bagre*, *Brustiaris*, *Cathorops dasycephalus*, *Cochlefelis*, *Galeichthys*, *Genidens* (with exception of *G. genidens*), *Nemapteryx*, *Neoarius*, *Netuma*, *Notarius*, *Plicofollis* (with exception of *P. platystomus*), *Potamosilurus* (with exception of *P. velutinus*) and *Sciades*]; (2) frontal forming most of the bony bridge composed by this bone and the lateral ethmoid (shared with *Amphiarius*, *Cathorops* and *Cephalocassis*); (3) transcapular process perpendicular to main axis of body (shared with *Arius*, *Bagre*, *Batrachocephalus*, *Brustiaris*, *Carlarius*, *Cephalocassis*, *Cochlefelis*, *Doiichthys*, *Genidens*, *Ketengus*, *Nedystoma*, *Neoarius*, *Netuma*, *Osteogeneiosus*, *Plicofollis*, *Potamarius*, *Potamosilurus* and *Sciades*); (4) space between transcapular process and otic capsule moderately wide (shared with *Arius*, *Aspistor*, *Bagre*, *Brustiaris*, *Carlarius*, *Cochlefelis*, *Doiichthys*, *Galeichthys*, *Genidens*, *Nedystoma*, *Neoarius*, *Netuma*, *Notarius*, *Plicofollis*, *Potamarius* and *Potamosilurus*); (5) contact face between transcapular process and basioccipital restricted and columnar [shared with *Arius* (with exception of *A. gagora*, *A. maculatus* and *A. manillensis*), *Batrachocephalus*, *Brustiaris*, *Carlarius*, *Cephalocassis*, *Cinetodus*, *Cochlefelis*, *Galeichthys*, *Genidens*, *Ketengus*, *Neoarius*, *Netuma*, *Osteogeneiosus*, *Pachyula*, *Plicofollis* (with exception of *P. platystomus*), *Potamarius*, *Potamosilurus* (with exception of *P. latirostris*) and *Sciades*]; (6) crest delimiting contact area between mesethmoid and premaxillary beginning at two thirds latero-anterior portion of former bone (shared with *Arius*, *Bagre*, *Batrachocephalus*, *Cochlefelis*, *Nemapteryx*, *Netuma* and *Potamosilurus velutinus*).



FIGURE 57. *Hemiaris stormii*, MZUSP 28275, 160 mm TL. Lateral view.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal delimiting a large fenestra visible under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital absent; posterior cranial fontanel well differentiated and oval shaped; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process funnel shaped moderately long with posterior portion clearly narrower than its base; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated

with vomer round; accessory tooth plates narrow and transversely elongate, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very long, as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum narrow with second dorsal process on upper portion; posterior cleithral process short distinct from dorsal process of cleithrum.

Remarks. No specimen of *H. hardenbergi* (Kailola, 2000), *H. harmandi* Sauvage, 1880 and *H. verrucosus* (Ng, 2003) could be obtained for examination. The inclusion of the species in the genus is tentative and exclusively based on supplementary morphological characters, obtained from the literature.

Distribution and habitat. South and southeast Asia, predominantly brackish waters.

***Hemiarus hardenbergi* (Kailola, 2000)**

Arius hardenbergi Kailola, 2000: 137, figs. 7–8. Type locality: Maimeri River, 2°06'S, 133°45'E, Bintuni Bay, Papua (Irian Jaya). Holotype: WAM P.29966-001. Paratypes: AMS I.29291-001, NCIP 436, QM I.26088.

Distribution: Southern New Guinea.

Countries: Papua New Guinea.

Habitat: Marine and brackish waters.

Maximum size: 260 mm SL.

***Hemiarus harmandi* Sauvage, 1880**

Hemiarus harmandi Sauvage, 1880: 230. Type locality: Isle de Phu-Quoc, gulf of Thailand. Holotype: MNHN A-2390. Synonym: *Arius brevirostris* Steindachner, 1901: 447. Type locality: Baram River, Borneo. Holotype: whereabouts unknown.

Arius brevirostris Steindachner, 1901: 447. Type locality: Baram River, Borneo. Holotype: whereabouts unknown.

Distribution: South and southeast Asia.

Countries: Thailand.

Habitat: Predominantly brackish waters.

Maximum size: 120 mm TL.

***Hemiarus stormii* (Bleeker, 1858)**

(fig. 57)

Cephalocassis stormii Bleeker, 1858: 246. Type locality: Mussi River, Palembang, south of Sumatra, Indonesia. Syn-types: BMNH 1863.12.4.65.

Distribution: South and southeast Asia.

Countries: Thailand, Vietnam and Indonesia.

Habitat: Predominantly brackish waters.

Maximum size: 320 mm TL.

Material examined: ANSP 60720 (10 al, 62–102 mm SL) (1 c&s), Thailand, Bangkok, Siam.

***Hemiarus sumatranus* (Anonymous, 1830)**

Bagrus sumatranus Anonymous, 1830: 691. Type locality: Sumatra, Indonesia. Syntypes: BMNH 1855.12.26.485.

Distribution: South and southeast Asia.

Countries: Pakistan, India, Sri Lanka, Myanmar and Indonesia.

Habitat: Marine, brackish and fresh waters.

Maximum size: 320 mm TL.

Material examined: CAS 140223 (6 al, 54–70 mm TL) (1 c&s), Myanmar, Rangoon.

***Hemiarus verrucosus* (Ng, 2003)**

Arius verrucosus Ng, 2003: 3, fig 1. Type locality: Mekong River at BanHang Khone, just downstream from Khone Falls, Champasak, Laos. Holotype: UMMZ 235408. Paratypes: CAS 96570, UMMZ 214609, UMMZ 214611, UMMZ 214619, UMMZ 232326.

Distribution: Mekong River and possibly lower Bang Pakong

Countries: Laos

Habitat: Freshwater



FIGURE 58. *Ketengus typus*, ANSP 60704, 162 mm TL. Lateral view.

***Ketengus* Bleeker, 1847**
(fig. 58)

Ketengus Bleeker, 1847: 167. Type species: *Ketengus typus* Bleeker, 1847. Type by monotypy. Gender: masculine.

Diagnosis. *Ketengus* can be differentiated from all other members of the Ariidae by exclusive (1 to 9) and shared (10 to 19) characters: (1) fenestra delimited by mesethmoid and lateral ethmoid wide and filled with cartilage (fig. 59); (2) vomer diamond shaped (fig. 60); (3) vomerine lateral processes absent (fig. 60); (4) a single point of contact between lateral ethmoid and frontal (fig. 59); (5) lachrymal with three anterior branches (fig. 61); (6) tooth band on dentary reaching posterior end of bone; (7) dorsal crest of premaxilla, delimiting contact area between mesethmoid and premaxilla absent; (8) second and third basibranchials indistinct (fig. 62); (9) first and second hypobranchials boomerang shaped (fig. 62); (10) posterior horn of mesethmoid tubular and thin (fig. 59) [shared with *Cathorops* (with exception of *C. dasycephalus*)]; (11) mesethmoid posterior branches thin (fig. 59) [shared with *Bagre* (with exception of *B. panamensis*), *Cathorops*, *Cephalocassis*, *Doiichthys*, *Nedystoma* and *Nemapteryx*]; (12) mesethmoid posterior branches parallel over their entire length (fig. 59) (shared with *Cathorops*, *Cephalocassis*, *Doiichthys*, *Nedystoma* and *Nemapteryx*); (13) acces

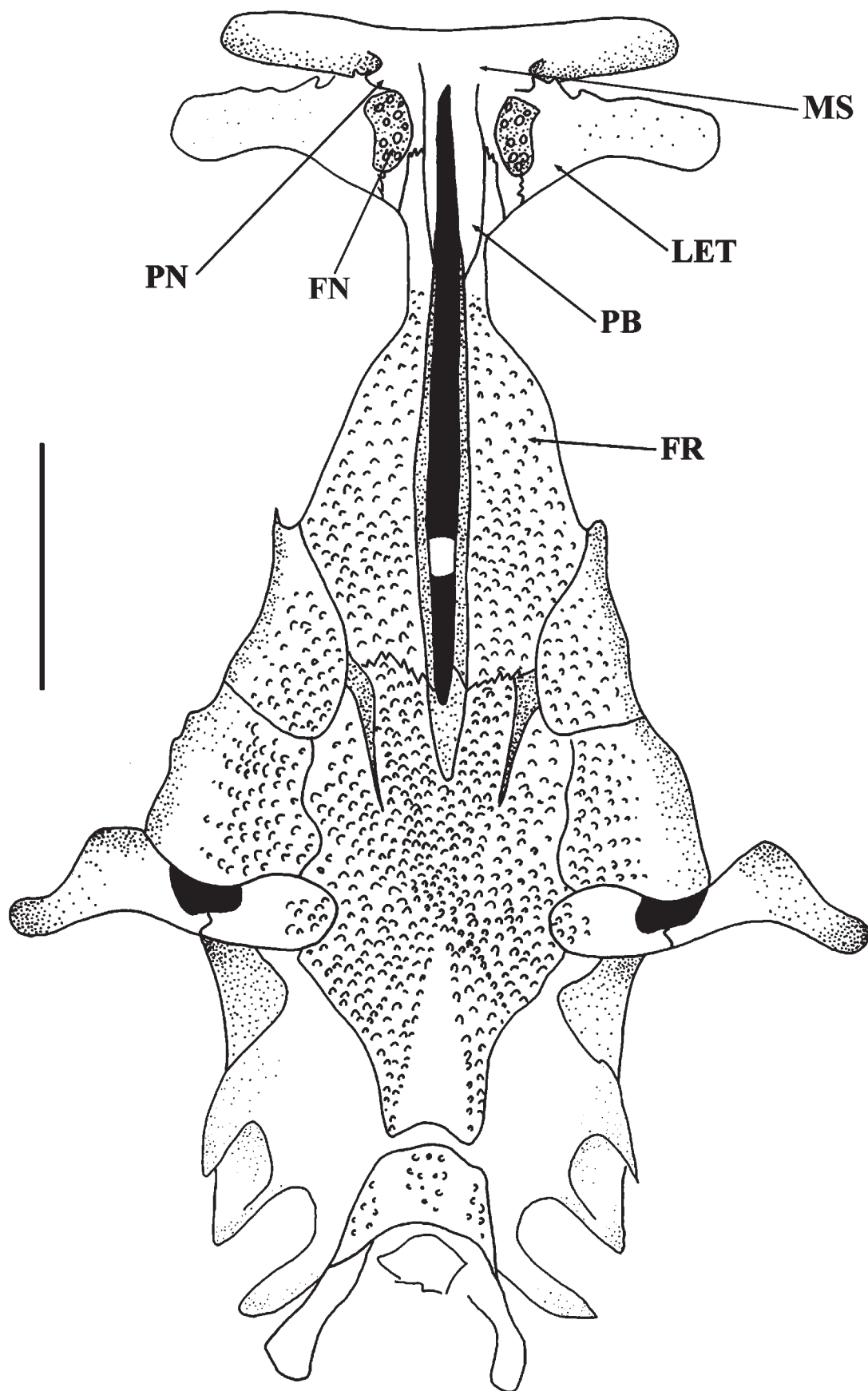


FIGURE 59. *Ketengus typus*, ANSP 60704. Dorsal view of neurocranium. Scale bar = 10 mm. **FN** — fenestra; **FR** — frontal; **LET** — lateral ethmoid; **MS** — mesethmoid; **PB** — posterior branch; **PN** — posterior horn.

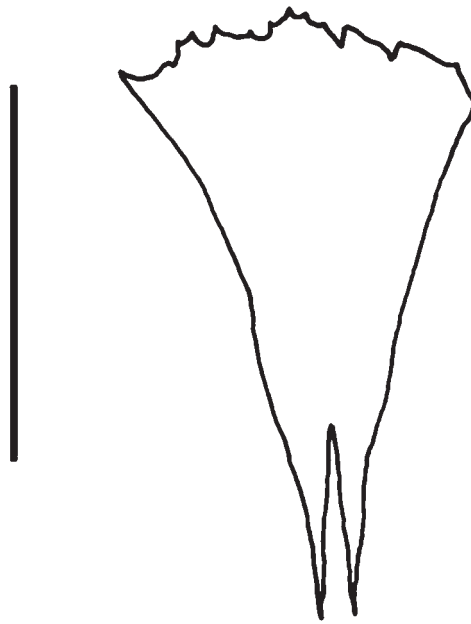


FIGURE 60. *Ketengus typus*, ANSP 60704. Ventral view of vomer. Scale bar = 4 mm.

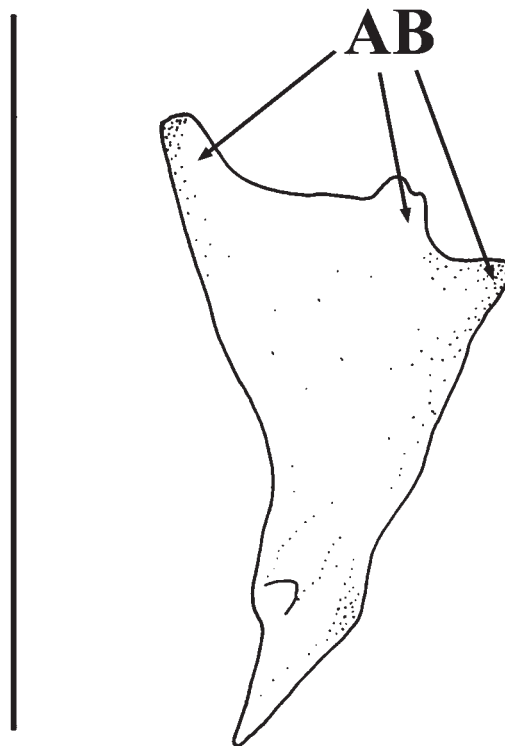


FIGURE 61. *Ketengus typus*, ANSP 60704. Dorsal view of lachrymal. Scale bar = 4 mm. **AB** — anterior branches.

sory tooth plates absent (shared with *Cephalocassis borneensis*, *Nedystoma*, *Pachyula*, *Potamarius izabalensis* and *Potamosilurus velutinus*); (14) anterior portion of opercle subtriangular (shared with *Cochlefelis*, *Sciades emphysetus*, *S. passany* and *S. proops*); (15) posteroventral portion of opercle little pronounced posteriorly [shared with *Bagre panamensis*, *Carlarius* (with exception of *C. heudelotii*), *Galeichthys*, *Genidens*, *Plicofol-*

lis (with exception of *P. platystomus*) and *Sciades* (with exception of *S. couma* and *S. felis*); (16) hyomandibular lower crest absent (shared with *Cathorops* and *Cephalocassis*); (17) second epibranchial overlaying first (shared with *Bagre* and *Galeichthys*); (18) third pharyngobranchial not mesially angulated hourglass shaped (shared with *Doiichthys* and *Potamarius grandoculis*); (19) seventh vertebra anterior most element free from lower superficial ossification (shared with *Amphiarus*, *Aspistor*, *Cathorops*, *Cephalocassis*, *Cinetodus*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Hemiarus*, *Nedystoma*, *Nemapteryx* and *Pachyula*).

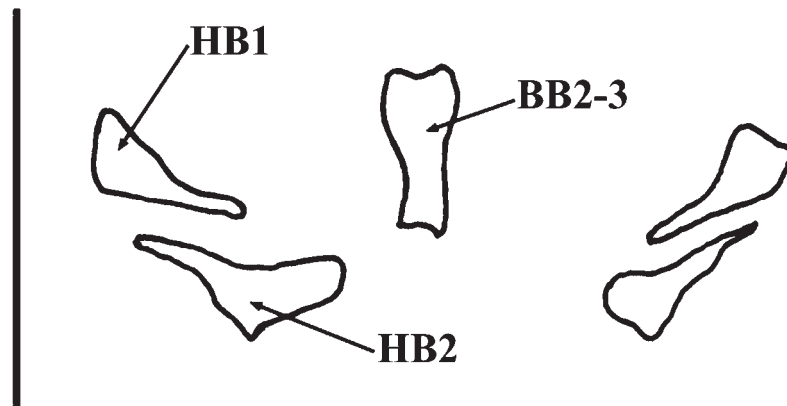


FIGURE 62. *Ketengus typus*, ANSP 60704. Dorsal view of hypobranchials and basibranchials. Scale bar = 4 mm. **BB2-3** — second and third basibranchials; **HB1** — first hypobranchial; **HB2** — second hypobranchial.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; fenestra between lateral ethmoid and frontal absent; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel moderately developed, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, short and moderately large, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer absent; accessory tooth plates absent; maxillary barbel fleshy; two pairs of mental barbels; base of adipose fin moderately long, about half as long as anal-fin base length; lateral line bifurcated at caudal region, reaching base of caudal-fin upper and lower lobes; cleithrum wide with second dorsal process on upper its portion; posterior cleithral process of moderate size, distinct from dorsal process of cleithrum.

Distribution and habitat. South and southeast Asia, brackish waters.

***Ketengus typus* Bleeker, 1847**

(fig. 58)

Ketengus typus Bleeker, 1847: 9. Type locality: Banjermassing, Java, in rivers. Syntypes: BMNH 1863.12.4.12. Bleeker specimens: NMV 46234.

Pimelodus pectinidens Cantor, 1849: 1243. Type locality: Pinang, Malaysia. Holotype: whereabouts unknown.

Distribution: South and southeast Asia.

Countries: India, Andaman Island, Malaysia, Thailand and Indonesia.

Habitat: Brackish and rarely freshwaters.

Maximum size: 240 mm TL.

Material examined: ANSP 60704 (3 al, 43–162 mm TL) (1 c&s), Thailand, Bangkok, Siam.

Nedystoma Ogilby, 1898
(fig. 63)

Nedystoma Ogilby, 1898: 32. Type species: *Hemipimelodus dayi* Ramsay & Ogilby, 1886. Type by original designation and also monotypy. Gender: neuter.

Diagnosis. *Nedystoma* can be distinguished from all other members of the Ariidae through the combination of exclusive (1 to 3) and shared (4 to 9) characters: (1) premaxillary anterior margin fringed; (2) third external branchiostegal ray in form of a spatula; (3) pharyngeal tooth plates very long and narrow (fig. 64); (4) accessory tooth plates absent (shared with *Cephalocassis borneensis*, *Ketengus*, *Pachyula*, *Potamarius izabalensis* and *Potamosilurus velutinus*); (5) opercle anterior part trapezoid shaped, long and narrow (shared with *Bagre*, *Cinetodus* and *Galeichthys*); (6) upper hyomandibular crest short and high (shared with *Amphiarius*, *Arius*, *Aspistor*, *Batrachocephalus*, *Cathorops*, *Hemiaris*, *Ketengus*, *Notarius*, *Osteogeneiosus*, *Plicofollis platystomus* and *Potamosilurus*); (7) contact face between first epibranchial and first pharyngobranchial very conspicuous [shared with *Arius arius*, *A. gagora*, *A. madagascariensis*, *Brustarius*, *Osteogeneiosus*, *Plicofollis* (with exception of *P. platystomus*) and *Potamosilurus*]; (8) lateral face of third pharyngobranchial conspicuous and acute (shared with *Arius*, *Brustarius*, *Neoarius*, *Netuma*, *Plicofollis* and *Potamosilurus*); (9) transversal crest of neural spine of fourth vertebra very high (shared with *Amphiarius*, *Bagre*, *Batrachocephalus*, *Cathorops*, *Cinetodus*, *Cryptarius*, *Ketengus*, *Hemiaris*, *Nemapteryx*, *Notarius planiceps*, *Osteogeneiosus*, *Pachyula* and *Sciades platypogon*).



FIGURE 63. *Nedystoma dayi*, USNM 217082, 186 mm TL. Lateral view.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal delimiting a large fenestra clearly visible under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital absent; posterior cranial fontanel well differentiated, large and oval shaped; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, very long and narrow, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer absent; accessory tooth plates absent; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum narrow, with second dorsal process on its upper portion; posterior cleithral process short and distinct from second dorsal process of cleithrum.

Distribution and habitat. Southern New Guinea, predominantly freshwaters.

***Nedystoma dayi* (Ramsay & Ogilby, 1886)**

(fig. 63)

Hemipimelodus dayi Ramsay & Ogilby, 1886: 16. Type locality: Strickland River, New Guinea. Holotype: AMS b.9938. Paratypes: AMS B. 9939-40. QM I.879, NMV 51616-19.

Distribution: Southern New Guinea.

Countries: Indonesia and Papua New Guinea.

Habitat: Predominantly freshwaters, but also in brackish waters.

Maximum size: 320 mm SL.

Material examined: AMS I.25992-002 (1 c&s), Papua New Guinea, Kibi Creek, Wabo; USNM 217082 (3 al, 121–187 mm TL) (1 c&s), Papua New Guinea, side channel of Strickland 4 km downstream from massy bakers junction, 450 km upriver from Toro Pass.

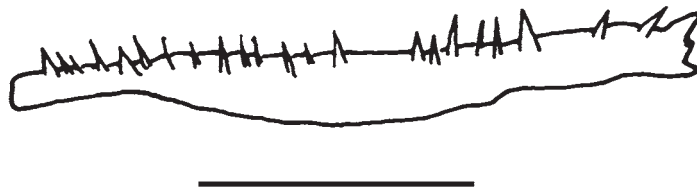


FIGURE 64. *Nedystoma dayi*, AMS I.25992-001. Ventral view of pharyngeal tooth plate. Scale bar = 4 mm.

***Nemapteryx* Ogilby, 1908**

(fig. 65)

Nemapteryx Ogilby, 1908: 3, 10. Type species: *Arius stirlingi* Ogilby, 1898. Type by original designation and also monotypy. Gender: feminine.

Diagnosis. Distinguished from all other members of the Ariidae by the combination of the following shared characters: (1) mesethmoid posterior branches very long, limiting more than half of the anterior cranial fontanel [shared with *Cathorops* (with exception of *C. dasycephalus*)]; (2) lateral processes of vomer very wide (shared with *Arius*, *Aspistor*, *Bagre*, *Batrachcephalus*, *Cinetodus*, *Galeichthys*, *Notarius planiceps*, *Osteogeneiosus*, *Pachyula*, *Plicofollis tenuispinis*, *P. platystomus*, *Potamosilurus* and *Sciades*); (3) vomerine tooth plates present [shared with *Aspistor*, *Bagre*, *Brustarius*, *Cathorops dasycephalus*, *Cochlefelis*, *Galeichthys*, *Genidens* (with exception of *G. genidens*), *Hemiaris*, *Neoarius*, *Netuma*, *Notarius*, *Plicofollis* (with exception of *P. platystomus*), *Potamosilurus* (with exception of *P. velutinus*) and *Sciades*]; (4) medial groove of neurocranium present [shared with *Arius*, *Bagre*, *Batrachcephalus*, *Brustarius*, *Carlarius*, *Cathorops*, *Cochlefelis*, *Cryptarius*, *Galeichthys*, *Genidens*, *Ketengus*, *Neoarius*, *Netuma*, *Notarius planiceps*, *Osteogeneiosus*, *Plicofollis*, *Potamarius*, *Potamosilurus* (with exception of *P. latirostris*) and *Sciades*]; (5) face for articulation between palatine and lateral ethmoid at central portion of former bone (shared with *Brustarius*, *Cochlefelis*, *Galeichthys* and *Neoarius*); (6) crest delimiting contact area between mesethmoid and premaxillary beginning at two thirds latero-anterior portion of former bone (shared with *Arius*, *Bagre*, *Batrachcephalus*, *Cochlefelis*, *Hemiaris*, *Netuma* and *Potamosilurus velutinus*).

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal limiting a large fenestra evident under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel well differentiated, large and oval shaped; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supra-

cleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process funnel shaped, moderately long, its posterior part conspicuously narrower than its base; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer round; accessory tooth plates present, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum narrow, with second dorsal process on its upper portion; posterior cleithral process short, distinct from second dorsal process of cleithrum.

Distribution and habitat. Southern New Guinea and northern Australia, marine and brackish waters.



FIGURE 65. *Nemapteryx armiger*, NTM F.188, 232 mm TL. Lateral view.

***Nemapteryx armiger* (De Vis, 1884)**

(fig. 65)

Arius armiger De Vis, 1884: 454. Type locality: New Britain. Syntypes: QM I.3088, I.3039.

Arius stirlingi Ogilby, 1898: 281. Type locality: Estuary of Adelaide River, Northern Territory, Australia. Holotype: SAMA F 1095.

Distribution: Southern New Guinea and northern Australia.

Countries: Indonesia, Papua New Guinea and Australia.

Habitat: Marine and brackish waters.

Maximum size: 360 mm TL.

Material examined: AMS I.27418-001 (1 c&s), Australia, North Territory, Murgarella Creek; CAS 60485 (2 al, 150–193 mm TL), Papua New Guinea, Moinamu (Kikori R.), gulf of Papua; NTM F.188 (5 al, 233–256 mm TL), Australia, Northern Territory, west of Alligator River.

***Neoarius* Castelnau, 1878**

(fig. 66)

Neoarius Castelnau, 1878: 237. Type species: *Arius curtisii* Castelnau, 1878. Type by monotypy. Gender: masculine.

Diagnosis. The species of *Neoarius* can be differentiated from all other genera of Ariidae by the combination of two shared characters: (1) lateral face of third pharyngobranchial conspicuous and acute (shared with *Arius*, *Brustiarius*, *Nedystoma*, *Netuma*, *Plicofollis* and *Potamosilurus*); (2) anterior process of first pharyngobranchial on the central part of this bone (shared with *Netuma*).

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal bones limiting a moderately large fenestra visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or supraoccipital; posterior cranial fontanel moderately developed long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, moderately long and wide, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer round; accessory tooth plates narrow, transversely elongate, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide, with second dorsal process on its upper portion; posterior cleithral process of moderate size, distinct from second dorsal process of cleithrum.

Remarks. *N. augustus* (Roberts, 1978), *N. berneyi* (Whitley, 1941) and *N. pectoralis* (Kailola, 2004) were included on the basis of the supplementary morphological characters observed in specimens preserved in alcohol or described in the literature.

Distribution and habitat. Southern New Guinea and Australia, marine, brackish and fresh waters.



FIGURE 66. *Neoarius graeffei*, AMNH 51641, 105 mm TL. Lateral view.

***Neoarius augustus* (Roberts, 1978)**

Arius augustus Roberts, 1978: 36, figs.14, 20d. Type locality: Middle Fly River, Papua New Guinea, 6°32.5'S, 140°55'E. Holotype: AMS 27090-001. Paratypes: AMS 22460-001, KFRS 681.01, USNM 217066, USNM 217067-68.

Distribution: Southern New Guinea.

Countries: Papua New Guinea.

Habitat: Freshwater.

Maximum size: 900 mm SL.

***Neoarius berneyi* (Whitley, 1941)**

Tachysurus (*Pararius*) *berneyi* Whitley, 1941: 9, fig. 8. Type locality: Pools of Flinders River, near Hughender and Richmond, Queensland, Australia. Holotype: AMS I.13076. Paratypes: AMS I.13075, I.8077-88.

Arius cleptolepis Roberts, 1978: 37, figs. 15, 20e. Type locality: Elevala River, Upper Fly River, Papua New Guinea, 6°05.7'S, 141°27.7'E. Holotype: AMS I.13076. Paratypes: USNM 217071, KFRS 618.01, 217070, 217071, 217072.

Distribution: Southern New Guinea and northern Australia.

Countries: Papua New Guinea and Australia.

Habitat: Freshwater.

Maximum size: 480 mm SL.

Material examined: AMNH 51648 (2 al, 166–210 mm TL), Australia, Northern Territory, Red Lily lagoon, 9 miles northeast of Elsey Homestead; LACM 44931-1 (2 al, 99–203 mm TL), Australia, Northern Territory, Wilton River, channel coming out of lagoon; MZUSP 38657 (1 al, 113 mm SL), Australia, northern Australia, Wilton River.

***Neoarius graeffei* (Kner & Steindachner, 1867)**

(fig. 66)

Arius graeffei Kner & Steindachner, 1867: 383 [28], pl. 4 (fig. 12). Type locality: Samoa. Holotype: NMW 67152.

Arius australis Günther, 1867: 103. Type locality: Hunter River near Ash Island., N.S.W., Australia. Syntypes: BMNH 1866.2.13.4, 1866.6.19.7-8.

Arius curtisii Castelnau, 1878: 236. Type locality: Moreton Bay, Queensland, Australia. Syntypes: MNHN B-0693.

Distribution: Southern New Guinea and northern Australia.

Countries: Indonesia, Papua New Guinea and Australia.

Habitat: Brackish and Freshwaters.

Maximum size: 500 mm TL.

Material examined: AMNH 51641 (7 al, 92–118 mm TL) (1 c&s), Australia, Northern Territory, south Alligator River where it crosses Oenpelli-Darwin road.

***Neoarius midgleyi* (Kailola & Pierce, 1988)**

Arius midgleyi Kailola & Pierce, 1988: 75, figs. 1–2, 5–6. Type locality: Wickham Gorge, Victoria River, Northern Territory, Australia. Holotype: AMS I.20858-005. Paratypes: AMNH 57082, 57454, AMS 25315-001; WAM P.21338-002, P. 25597-001, P.25708-001, P. 28776-001.

Distribution: Australia.

Countries: Australia.

Habitat: Predominantly brackish waters.

Maximum size: 700 mm TL.

Material examined: AMNH 51651 (16 al, 146–278 mm TL) (1 c&s), Australia, Northern Territory, south Alligator River on pine Creek-Oenpelli road.

***Neoarius pectoralis* (Kailola, 2000)**

Arius pectoralis Kailola, 2000: 133, figs. 5–6. Type locality: Chapman River, Queensland, 14°56'S, 141°38'E, Australia. Holotype: AMS I.27415-001. Paratypes: CSIRO A.3608-10, H.4937-02, H.5174-07, NTM S.10235-001, S.102524-001, S.10319-003, NTM S.13004-001, S.11507-004, QM I.14917.

Distribution: Southern New Guinea and Australia.

Countries: Papua New Guinea and Australia.

Habitat: Marine and brackish waters.

Maximum size: 310 mm TL.

Species *inquirendae*

Bagrus venaticus Richardson, 1845: 33. Type locality: Nw. coast of Australia. Holotype: whereabouts unknown.

Netuma Bleeker, 1858

(fig. 67)

Catastoma Kuhl & van Hasselt in Cuvier & Valenciennes, 1840b: 60. Type species: *Catastoma nasutum* Kuhl & van Hasselt, 1840. Type by monotypy. Gender: neuter.

Sarcogenys Bleeker, 1858: 96. Type species: *Sarcogenys rostratus* Kuhl & van Hasselt. Gender: feminine.

Netuma Bleeker, 1858: 62, 67, 93. Type species: *Bagrus netuma* Valenciennes, 1840. Type by absolute tautonymy. Gender: feminine.

Diagnosis. The combination of the following unique (1 and 2) and shared (3 to 10) characters distinguishes *Netuma* from all other genera of the Ariidae: (1) two pairs of accessory tooth plates; (2) orbitosphenoid with a short and acute lateral process; (3) lateral processes of vomer thin (fig. 68) [shared with *Amphiarius*, *Brustarius*, *Carlarius*, *Cathorops*, *Cephalocassis*, *Cochlefelis*, *Cryptarius*, *Doiichthys*, *Genidens*, *Hemiaris*, *Nedystoma*, *Neoarius*, *Notarius* (with exception of *N. planiceps*) and *Potamarius*]; (4) premaxillary very wide its length more than 3 times in its width (shared with *Bagre*, *Brustarius*, *Cochlefelis* and *Galeichthys*); (5) posterior portion of second basibranchial short (fig. 69) (shared with *Arius gagora*, *A. maculatus*, *Aspistor* and *Genidens*); (6) anterior process of first hypobranchial on central portion of bone (fig. 69) (shared with *Neoarius*); (7) lateral face of third pharyngobranchial very conspicuous and acute (shared with *Arius*, *Brustarius*, *Nedystoma*, *Neoarius*, *Plicofollis* and *Potamosilurus*); (8) base of adipose fin very short, less than one-half length of anal-fin base [shared with *Bagre*, *Brustarius*, *Cathorops*, *Cryptarius* and *Plicofollis* (with exception of *P. platystomus*)]; (9) origin of adipose fin vertically over posterior half of anal fin [shared with *Bagre*, *Brustarius* and *Plicofollis* (with exception of *P. platystomus*)]; (10) lateral line bifurcated at caudal region (shared with *Arius*, *Bagre*, *Batrachocephalus*, *Ketengus*, *Osteogeneiosus*, *Plicofollis* and *Sciades couma*).

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal delimiting a small fenestra indistinct under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel reduced or entirely closed with growth; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supra-acleithrum and extrascapular present or absent; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular moderately long and wide, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer round; accessory tooth plates present, anterior pair transversely elongate and narrow, posterior one triangular shaped, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very short, less than one-half length of anal-fin base; lateral line bifurcated at caudal region, reaching base of caudal-fin upper and lower lobes; cleithrum wide with second dorsal process on its upper portion; posterior cleithral process of moderate size, distinct from second process dorsal to cleithrum.

Remarks. The nominal genera *Catostoma* and *Sarcogenys* are *nomina nuda* since they were published without description of the genera and of the type-species (*Catostoma nasutum* Kuhl & van Hasselt, 1840 = *Bagre thalassinus* Rüppell, 1837 and *Sarcogenys rostratus* Kuhl & van Hasselt, 1858 = *Bagre thalassinus* Rüppell, 1837), making it impossible recognizing them (International Code of Zoological Nomenclature, articles 11d and 16).

Distribution and habitat. Eastern Africa, South and southeast Asia, southern New Guinea and northern Australia, marine and brackish waters.



FIGURE 67. *Netuma thalassinus*, UMMZ 214610, 138 mm TL. Lateral view.

***Netuma bilineatus* (Valenciennes, 1840)**

Bagrus bilineatus Valenciennes in Cuvier & Valenciennes, 1840a: 434. Type locality: Pondicherry, India; Rangoon, Myanmar. Syntypes: MNHN A-9344, Pondicherry.

Bagrus rhodonotus Bleeker, 1846: 157. Type locality: Jakarta, Java, Indonesia. Syntypes: RMNH 15865, SMNS 105

Arius andamanensis Day, 1871: 699 [23], in part. Type locality: Andaman Island. Syntypes: AMS B.7931, ZSI F1307.

Arius serratus Day, 1877: 462, pl. 105 (fig. 3) (in part). Type locality: Sind, Pakistan. Holotype: ZSI 467. Day specimens: AMS B.7971

Netuma osakae Jordan & Kanasawa in Jordan & Hubbs, 1925: 157, pl. 9 (fig.1). Type locality : Fish market, Osaka, Japan. Holotype: FMNH 59388.

Arius dayi Dmitrenko, 1974: 39, figs. 1–2. Type locality: Masir Strait, gulf of Oman, 19°47.8'N, 58°28.3'E. Holotype: Zool. Mus. Ukrainian Acad. Kiev Pi 2/1-2. Paratypes: Coll. Fish. Inst. Kerch (several), Zool. Mus. Odessa Univ.

Distribution: South and southeast Asia, southern New Guinea and northern Australia.

Countries: India, Thailand, Vietnam, Malaysia, Indonesia, Philippines, China, Papua New Guinea and Australia.

Habitat: marine and brackish waters.

Maximum size: 750 mm TL.

Material examined: ANSP 79487 (2 al, 114–124 mm SL), Philippines, Orion, Bataan province, Luzon; UMMZ 155785 (5 al, 98–245 mm TL) (1 c&s), Indonesia, Java; vicinity of Batavia, Pasan Ikan at Batavia, fish market; MZUSP 38656 (2 al, 145–157 mm SL) (1 c&s), Australia, Arafura Sea.

***Netuma thalassinus* (Rüppell, 1837)**

(fig. 67)

Bagrus thalassinus Rüppell, 1837: 75, pl. 20 (fig. 2). Type locality: Massawa, Eritrea, Red Sea. Syntypes: SMF 544, 5414, 2627, 5740.

Bagrus netuma Valenciennes in Cuvier & Valenciennes, 1840a: 438, pl. 417. Type locality: Pondcherry, India. Syntypes:

MNHN A-9345.

Bagrus laevigatus Valenciennes in Cuvier & Valenciennes, 1840a: 439. Type locality: Red Sea. Holotype: MNHN B-0710.

Arius nasutus Valenciennes in Cuvier & Valenciennes, 1840b: 60. Type locality: Java, Indonesia; Malabar, India; Red Sea. Syntypes: MNHN a-9409, Red Sea, RMNH D2390, Java.

Catastoma nasutum Kuhl & van Hasselt in Cuvier & Valenciennes, 1840b: 60.

Bagrus carchariorhynchus Bleeker, 1871: 291. Type locality: Jakarta, Java, Indonesia. Holotype: RMNH 6885.

Sarcogenys rostratus Kuhl & van Hasselt in Bleeker, 1858: 96.

Arius andamanensis Day, 1871: 69, in part. Type locality: Andman Island. Syntypes: AMS B.7931, ZSI FI307.

Arius serratus Day, 1877: 462, pl. 105 (fig. 3), in part. Type locality: Port Jackson, Sydney, N.S.W., Australia. Holotype: ZSI 467.

Ariodes aeneus Sauvage, 1883: 462. Type locality: Singapore. Syntypes: MNHN A-5155.

Netuma thalassina jacksonensis Whitley, 1941: 12, fig. 8 (Nos. 1-2). Type locality: Port Jackson, Sydney, N.S.W., Australia. Holotype: AMS I.10095. Paratypes: AMS I.4689.

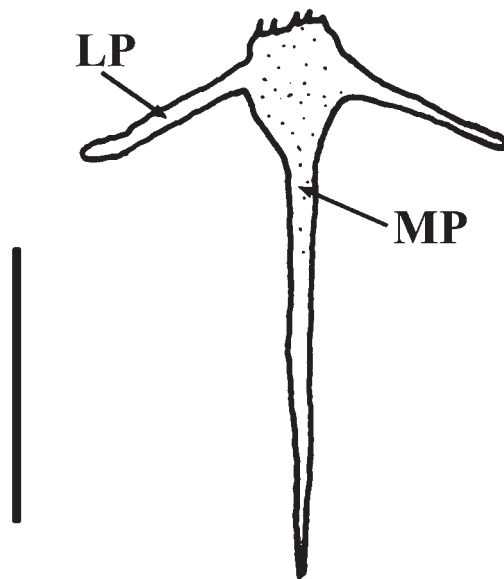


FIGURE 68. *Netuma thalassinus*, UMMZ 214630. Ventral view of vomer. Scale bar = 4 mm. **LP** — lateral process; **MP** — medial process.

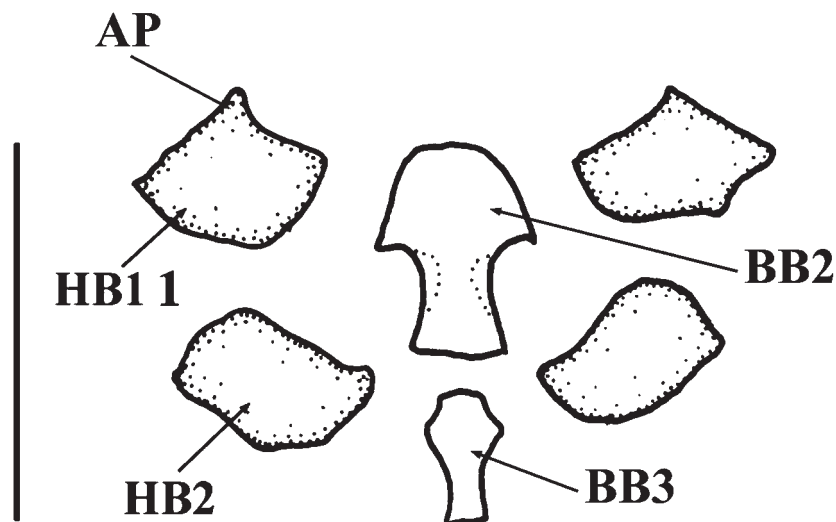


FIGURE 69. *Netuma thalassinus*, UMMZ 214630. Dorsal view of first and second hypobranchials. Scale bar = 4 mm. **AP** — anterior process; **BB2** — second basibranchial; **BB3** — third basibranchial; **HB1** — first hypobranchial; **HB2** — second hypobranchial.

Distribution: Eastern Africa, south and southeast Asia to New Guinea and Australia.

Countries: India, Thailand, Vietnam, Indonesia, Malaysia, Philippines, China, Papua New Guinea and Australia.

Habitat: Mostly marine waters.

Maximum size: 1.800 mm TL.

Material examined: UMMZ 214610 (4 al), Vietnam, Bac Lieu, South China Sea, Paknam Sta. 13, 39 km SE of Bac Lieu province, Mekong River Plume; UMMZ 214630 (3 al) (1 c&s), Vietnam, Bac Lieu, south China Sea, Paknam Sta. 13, 39 km SE of Bac Lieu province, Mekong River Plume.

***Notarius* Gill, 1863**

(fig. 70)

Notarius Gill, 1863: 171. Type species: *Arius grandicassis* Valenciennes, 1840. Type by monotypy. Gender: masculine. *Sciadeops* Fowler, 1944: 211. Type species: *Sciades troschelii* Gill, 1863. Type by original designation and also monotypy (subgenus of *Sciades*). Gender: masculine.

Diagnosis. *Notarius* can be distinguished from all other genera in the Ariidae through two non-exclusive characters: (1) first external branchiostegal ray very thin at proximal portion, wide at distal portion (shared with *Arius caelatus*, *Bagre*, *Batrachocephalus*, *Brustiarius*, *Carlarius*, *Cochlefelis*, *Doiichthys*, *Galeichthys*, *Ketengus*, *Neoarius*, *Netuma*, *Osteogeneiosus*, *Sciades emphysetus*, *S. passany* and *S. proops*); (2) 15 or more ribs [shared with *Bagre*, *Carlarius*, *Cochlefelis*, *Genidens*, *Neoarius*, *Netuma*, *Plicofollis* (with exception of *P. platystomus*) and *Sciades*].



FIGURE 70. *Notarius grandicassis*, MZUSP 61341, 150 mm TL. Lateral view.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal bones limiting a moderately developed fenestra visible under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital absent (except in *N. planiceps*); posterior cranial fontanel well developed, with oval shaped; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, moderately long and wide, progressively narrower toward its posterior part (except in *N. grandicassis*); anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer round; accessory tooth plates well developed, triangular or oval shaped, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very long, as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide, with second dorsal process on its upper portion; posterior cleithral process moderately developed and distinct of second dorsal process of cleithrum.

Remarks. The nominal genus *Sciadeops* is a junior synonym of *Notarius*. The inclusion of *N. planiceps* (Steindachner, 1877) in the genus is supported by supplementary morphological characters and its expected

that further studies provide better data for its allocation. *N. kessleri* (Steindachner, 1877) was preliminary included based on the presence of diagnostic features of the genus in preserved specimens. No specimens of *N. armbrusteri* Betancur-R & Acero, 2006, *N. biffi* Betancur-R & Acero, 2004, *N. cookei* (Acero & Betancur-R, 2002), *N. insculptus* (Jordan & Gilbert, 1883), *N. neogranatensis* (Acero & Betancur-R, 2002) and *N. osculus* (Jordan & Gilbert, 1883) could be obtained for examination and their inclusion in *Notarius* is mainly based on the results obtained by Betancur-R & Acero (2004).

Distribution and habitat. Eastern and western Central and South America, marine and brackish waters.

***Notarius armbrusteri* Betancur-R & Acero, 2006**

Notarius armbrusteri Betancur-R & Acero, 2006: 50, figs. 1b, 2, 3 and 4. Type locality: fish market of Buenaventura, Valle Del Cauca, Colombia. Holotype: INVEMAR-PEC 6677. Paratypes: INVEMAR-PEC 6678, ICN-MHN 14829, USNM 292738, USNM 264834.

Distribution: Western South America

Countries: Colombia.

Habitat: unknown.

Maximum size: 208 mm SL.

***Notarius biffi* Betancur-R & Acero, 2004**

Notarius biffi Betancur-R & Acero, 2004: 3, figs. 1–3. Type locality: high salinity estuary, Bahía La Unión, El Salvador, 13°20'42" N, 87°49'07" W, 9 m. Holotype: STRI 6674. Paratypes: STRI 5713, UCR 2451-2, 2452-3, 2386-15.

Distribution: Western Central America.

Countries: Costa Rica and El Salvador.

Habitat: Marine and brackish waters.

Maximum size: 385 mm TL.

***Notarius cookei* (Acero & Betancur-R, 2002)**

Arius cookei Acero & Betancur-R, 2002: 134, figs. 1–2. Type locality: 7 km from mouth of Río Santa Maria, París, Herrera, Panama, 8°09'N, 80°33'W. Holotype: INVEMAR-PEC 3752. Paratypes: ICN-MHN 5721, INVEMAR-PEC 5753, UCR 314-3, 1518-2.

Distribution: Western Central and South America.

Countries: Costa Rica, Panama and Colombia.

Habitat: Brackish waters.

Maximum size: 428 mm SL.

***Notarius grandicassis* (Valenciennes, 1840)**

(fig. 70)

Arius grandicassis Valenciennes in Cuvier & Valenciennes, 1840b: 54, pl. 427. Type locality: Guyana. Holotype: MNHN A-4608.

Arius parmacassis Valenciennes in Cuvier & Valenciennes, 1840b: 57. Type locality: Bahia, Brazil. Holotype: MNHN A-8966.
Arius stricticassis Valenciennes in Cuvier & Valenciennes, 1840b: 58. Type locality: Cayenne, French Guiana; Surinam. Syntypes: MNHN A-9406, RMNH 3034.
Arius vandeli Puyo, 1936: 123, figs. 21G, 22. Type locality: Cayenne River, French Guiana. Holotype: MNHN 1936-0160.

Distribution: North and eastern South America.

Countries: Venezuela, Guyana, Surinam, French Guiana and Brazil.

Habitat: Brackish waters.

Maximum size: 630 mm TL.

Material examined: MZUSP 10092-10103 (2 c&s), Brazil, Espirito Santo, between São Mateus and the rio Doce; MZUSP 51705 (1 es), Brazil, São Paulo, Bertiooga; MZUSP 61341 (1 al, 121 mm SL), Brazil, Bahia, Caravelas, estuary and mouth of rio Caravelas.

***Notarius insculptus* (Jordan & Gilbert, 1883)**

Arius insculptus Jordan & Gilbert, 1883: 41. Type locality: Panama. Lectotype: USNM 29415. Paralectotypes: USNM 30977.

Distribution: Western Central America.

Countries: Panama.

Habitat: Marine waters.

Maximum size: 325 mm TL.

***Notarius kessleri* (Steindachner, 1877)**

Arius kessleri Steindachner, 1877: 574, pl. 5. Type locality: Altata, Panama (Pacific). Syntypes: MCZ 4944, NMW 48112, 48247-49.

Arius elatulus Jordan & Gilbert, 1883: 45. Type locality: Panama. Holotype: USNM 29408. Paratypes: USNM 30995.

Netuma insularum Greene in Gilbert, 1897: 439. Type locality: Gulf of Panama. Holotype: USNM 47577.

Netuma hassleriana Borodin, 1934: 33. Type locality: Panama. Holotype: MCZ 33213 [ex MCZ 4965]. Paratypes: MCZ 4965.

Distribution: Western Central America.

Countries: Mexico, Costa Rica and Panama.

Habitat: Marine and brackish waters.

Maximum size: 450 mm TL.

Material examined: FMNH 19064 (2 al, 347–392 mm TL), Panama, canal zone, Panama Bay, Balboa; FMNH 216986 (2 al, 268–286 mm TL), Mexico.

***Notarius lentiginosus* (Eigenmann & Eigenmann, 1888)**

Tachisurus lentiginosus Eigenmann & Eigenmann, 1888: 139. Type locality: Panama (Pacific). Syntypes: MCZ 4970.

Galeichthys xenauchen Gilbert in Jordan & Evermann, 1898: 2777. Type locality: Panama. Holotype: SU 5821.

Distribution: Western Central America.

Countries: Panama.

Habitat: Brackish waters.

Maximum size: 350 mm TL.

Material examined: USNM 293282 (7 al, 136–183 mm TL) (1 c&s), Panama, Darien prov., rio Chucunaque near confl. with rio Tuyra.

***Notarius neogranatensis* (Acero & Betancur-R, 2002)**

Arius neogranatensis Acero & Betancur-R, 2002: 7, figs 1–3. Type locality: Mouth of río Tinajonesmedio, San Antero, Cordoba, Colombia, 9°25'N, 75°48'W. Holotype: INVEMAR-PEC 3754. Paratypes: ICN-MHN 5722, INVEMAR-PEC 3755.

Distribution: North South America.

Countries: Colombia.

Habitat: Brackish waters.

Maximum size: 360 mm TL.

***Notarius osculus* (Jordan & Gilbert, 1883)**

Arius osculus Jordan & Gilbert, 1883: 46. Panama (Pacific). Holotype: USNM 29476.

Distribution: Western Central America.

Countries: Costa Rica and Panama.

Habitat: Marine and brackish waters.

Maximum size: 280 mm TL

***Notarius planiceps* (Steindachner, 1877)**

Arius planiceps Steindachner, 1877: 576 [26], pl. 4. Type locality: Altata, Panama (Pacific). Syntypes: NMW 48194-99, ZMUC 839.

Distribution: Western Central America.

Countries: Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama.

Habitat: Marine and brackish waters.

Maximum size: 600 mm TL.

Material examined: FMNH 19068 (3 al, 208–244 mm TL) (1 c&s), Panama, canal zone, Panama Bay, Balboa; USNM 79433 (2 al, 215–258 mm TL), Panama, Panama Bay, Balboa.

***Notarius troschelii* (Gill, 1863)**

Sciades troschelii Gill, 1863: 171. Type locality: Western coast of Central America. Holotype: USNM (not found).

Arius brandtii Steindachner, 1877: 571 [21], pl. 3. Type locality: Altata, Panama. Syntypes: MCZ 4964, NMW 48107, 48110.

Distribution: Western America.

Countries: Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Ecuador and Peru.

Habitat: Marine and brackish waters.

Maximum size: 520 mm TL.

Material examined: FMNH 57741 (5 al, 255–291 mm TL), Colombia, Tumaco; UMMZ. 194659 (7 al, 95–149 mm TL) (1 c&s), Costa Rica, Puntarenas, gulf of Nicoya, off Puntarenas, Pacific.

Species inquirendae

Bagrus temminckianus Valenciennes in Cuvier & Valenciennes, 1840a: 463. Type locality: Surinam, near Paramaribo. Holotype: RMNH (apparently lost).

***Osteogeneiosus* Bleeker, 1846**

(fig. 71)

Osteogeneiosus Bleeker, 1846: 173. Type species: *Arius militaris* Valenciennes, 1840 (= *Silurus militaris* Linnaeus, 1758). Type by subsequent designation by Bleeker (1862: 8; 1863: 93). Gender: Masculine.



FIGURE 71. *Osteogeneiosus militaris*, UMMZ 214628, 100 mm TL. Lateral view.

Diagnosis. *Osteogeneiosus* can be differentiated from all other members of the Ariidae by the combination of the following exclusive (1 to 9) and shared (10 to 15) characters: (1) nasal anterior portion notably curved; (2) bony blade anteriorly connecting nasal tubules absent; (3) lachrymal with three anterior and one lateral branches (fig. 72); (4) maxillary thin and very elongate (fig. 73); (5) maxillary condyles very large (fig. 73); (6) palatine cylindrical very thick and short (fig. 74); (7) posterior cartilage of palatine vestigial; (8) metapterygoid low and elongate, its greatest depth three times in its length (fig. 75); (9) mental barbels absent; (10) vomer posterior process very thin from its base [shared with *Plicofollis* (with exception of *P. tenuispinis* and *P. platystomus*)]; (11) fenestra delimited by lateral ethmoid and frontal bones well developed (shared with *Amphiarius*, *Cathorops*, *Cephalocassis*, *Cryptarius*, *Doiichthys*, *Hemiaris*, *Nedystoma* and *Nemapteryx*); (12) mesial laminar projection on frontal bones absent (shared with *Amphiarius*, *Arius*, *Aspistor*, *Cathorops*, *Cephalocassis*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Potamarius* and *Potamosilurus latirostris*); (13) anterior cartilage of palatine short, less than 1/3 on bone length (fig. 74) (shared with *Bagre* and *Galeichthys*); (14) urohyal medial process short (shared with *Galeichthys*); (15) space limited by posterior epioccipital process and crests associated with fourth vertebra very reduced, restricted to anterior portion [shared with *Arius*, *Carlarius*, *Brustarius*, *Cochlefelis*, *Genidens*, *Neoarius*, *Netuma*, *Plico-*

follis (with exception of *P. platystomus* and *P. tenuispinis*), *Potamarius grandoculis*, *Potamosilurus* and *Sciades* (with exception of *S. platypogon*)].

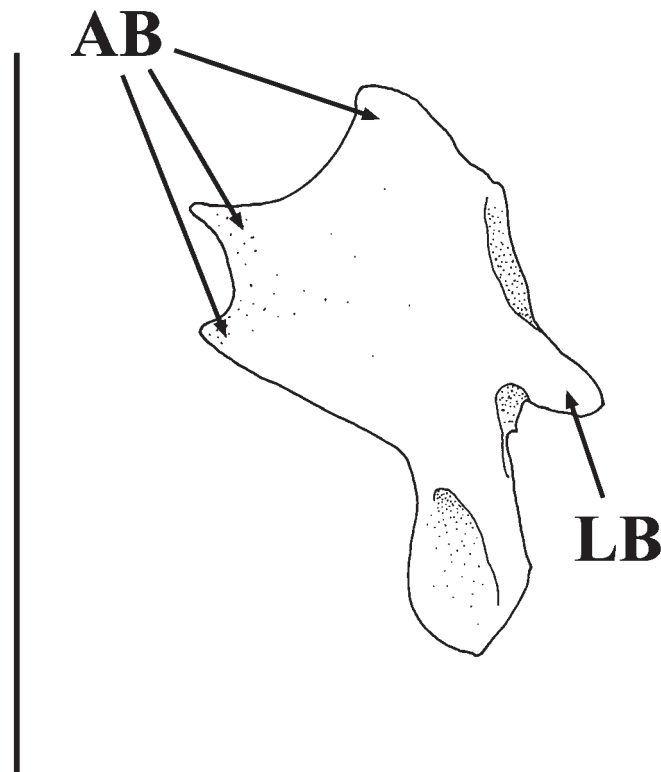


FIGURE 72. *Osteogeneiosus militaris*, UMMZ 214628. Dorsal view of lachrymal. Scale bar = 4 mm. **AB** — anterior branches; **LB** — lateral branch.



FIGURE 73. *Osteogeneiosus militaris*, UMMZ 214628. Mesial view of maxillary. Scale bar = 4 mm. **MXC** — maxillary condyle.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; a large fenestra limited by lateral ethmoid and frontal visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel moderately developed, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supra-cleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, moderately long and narrow, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer absent; accessory tooth plates longitudinally elongate, bearing molar-like teeth; maxillary barbel cylindrical and bony along its entire extension; base of adipose fin moderately long, about half as long as anal-fin base; lateral line bifurcated at caudal region, reaching base of caudal-fin upper and lower lobes; cleithrum wide, with second dorsal process on its upper portion; posterior cleithral process moderately long

and distinct from second dorsal process of cleithrum.

Distribution and habitat. South and southeast Asia, marine and brackish waters.

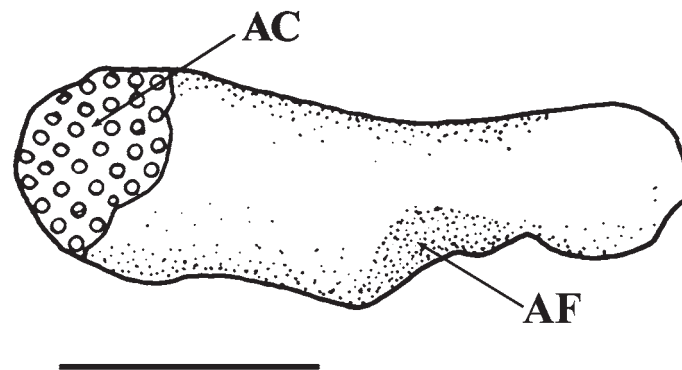


FIGURE 74. *Osteogeneiosus militaris*, UMMZ 214628. Dorsal view of palatine. Scale bar = 4 mm. AC — anterior cartilage; AF — articulation facet.

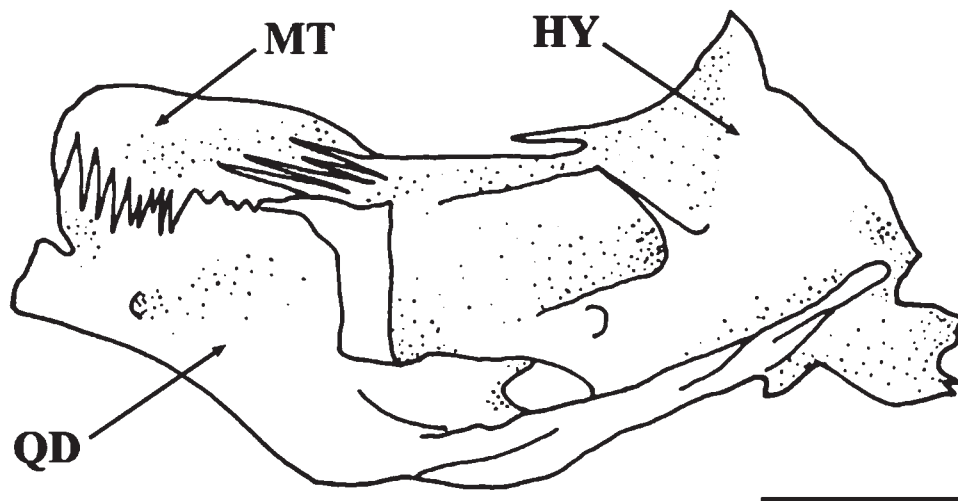


FIGURE 75. *Osteogeneiosus militaris*, UMMZ 214628. Lateral view of suspensorium. Scale bar = 4 mm. HY — hyomandibular; MT — metapterygoid; QD — quadrate.

***Osteogeneiosus militaris* (Linnaeus, 1758)**

(fig. 71)

Silurus militaris Linnaeus, 1758: 305. Type locality: Asia. No types known.

Osteogeneiosus macrocephalus Bleeker, 1846: 173. Type locality: Jakarta, Java, Indonesia. Syntypes: BMNH 1863.12.4.51, NMV 45847.

Osteogeneiosus ingluvies Bleeker, 1846: 174. Type locality: Jakarta, Java, Indonesia.

Osteogeneiosus longiceps Bleeker, 1846: 174. Type locality: Jakarta, Java, Indonesia.

Osteogeneiosus gracilis Bleeker, 1846: 175. Type locality: Jakarta, Java, Indonesia. No types known.

Osteogeneiosus blochii Bleeker, 1846: 175. Type locality: Jakarta, Java, Indonesia. No types known.

Osteogeneiosus valenciennesi Bleeker, 1846: 175. Type locality: Jakarta, Java, Indonesia. Syntypes: BMNH 1863.12.4.53, NMV 46593-94.

Osteogeneiosus cantor Bleeker, 1854: 120, pl. 2 (fig. 4). Type locality: Hooghly River, Calcutta, India. Syntypes: RMNH 607.

Osteogeneiosus stenocephalus Day, 1877: 469, pl. 108 (fig. 3). Type locality: Moulmein, Myanmar. Holotype: ZSI 1263.

Distribution: South and southeast Asia.

Countries: Pakistan, India Sri Lanka, Bangladesh, Singapore, Thailand, Myanmar, Vietnam, Indonesia and Malaysia.

Habitat: Marine and brackish waters.

Maximum size: 310 mm TL.

Material examined: LACM 38116-36 (4 al), Pakistan, fish market in Karschi; UMMZ 214628 (10 al, 71–186 mm TL) (1 c&s), Vietnam, Ba Xuyen prov, mouth of Bassac River, 2.5 km SE of Truong Binh, Mekong River drainage; USNM 207092 (7 al, 78–125 mm TL), India.

***Pachyula* Ogilby, 1898**

(fig. 76)

Pachyula Ogilby, 1898: 33. Type species: *Hemipimelodus crassilabris* Ramsay & Ogilby, 1886. Type by original designation and also monotypy. Gender: feminine.

Tetranesodon Weber, 1913: 545. Type species: *Tetranesodon conorhynchus* Weber, 1913. Type by monotypy. Gender: masculine.

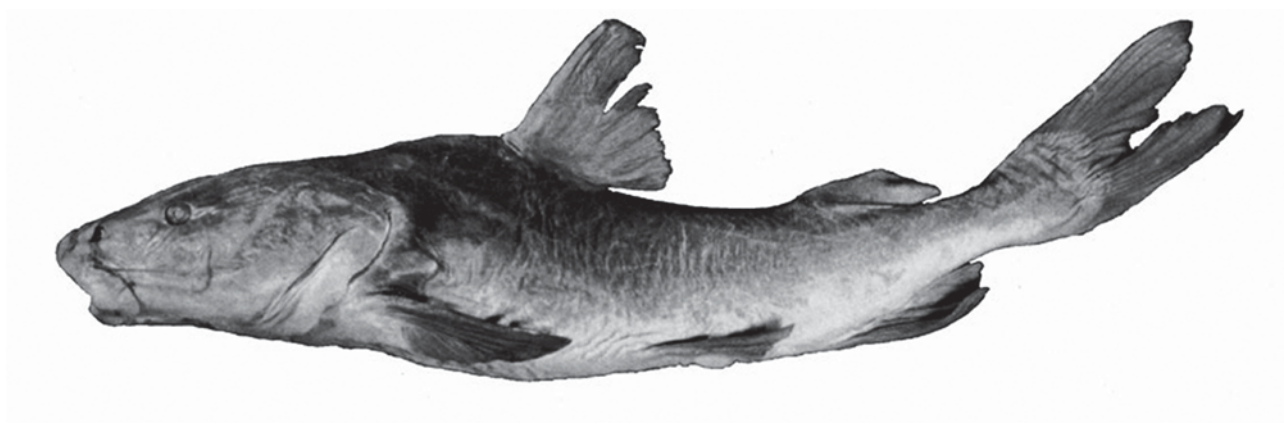


FIGURE 76. *Pachyula crassilabris*, Roberts, 1978. Lateral view.

Diagnosis. The combination of two shared characters distinguishes *Pachyula* from all other genera of the Ariidae: (1) accessory tooth plates absent (shared with *Cephalocassis borneensis*, *Ketengus*, *Nedystoma*, *Potamarius izabalensis* and *Potamosilurus velutinus*); (2) posterior face of first epibranchial with a well developed process [shared with *Plicofollis* (with exception of *P. platystomus*)].

Supplementary morphological characters. Cephalic shield granulated visible under the skin; a moderately developed fenestra limited by lateral ethmoid and frontal visible under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital absent; posterior cranial fontanel moderately developed, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital invading dorsal portion of cephalic shield; occipital process triangular, very long and narrow, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer absent; accessory tooth plates absent; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very long, as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide with second dorsal process on its upper portion; posterior cleithral process very long and distinct from second dorsal process of cleithrum.

Remarks. *Tetranesodon conorhynchus* Weber, 1913 is the type-species of *Tetranesodon* and was not examined but included by possessing the diagnostic characters of the genus available in the literature. Thus, the inclusion of *Tetranesodon* as synonymous of *Pachyula* is tentative.

Distribution and habitat. Southern New Guinea, freshwaters.

***Pachyula conorhynchus* (Weber, 1913)**

Tetranesodon conorhynchus Weber, 1913: 546, fig. 24. Type locality: Lorentz River, Van Weelskamp, New Guinea. Holotype: ZMA 111084.

Distribution: Southern New Guinea.

Countries: Indonesia.

Habitat: Freshwaters.

Maximum size: 200 mm SL.

***Pachyula crassilabris* (Ramsay & Ogilby, 1886)**

(fig. 76)

Hemipimelodus crassilabris Ramsay & Ogilby, 1886: 18. Type locality: Strickland River, New Guinea. Holotype: AMS B.9961. Paratypes: QM I. 857.

Distribution: Southern New Guinea.

Countries: Papua New Guinea.

Habitat: Freshwaters.

Maximum size: 520 mm SL.

Material examined: AMS I.27411-001 (1 c&s), Papua New Guinea, Kubipara.

***Plicofollis* Kailola, 2004**

(fig. 77)

Plicofollis Kailola, 2004: 141. Type species: *Arius argyropleuron* Valenciennes, 1840. Type by original designation. Gender: not clear from original description.

Diagnosis. *Plicofollis* can be distinguished from all other members of the Ariidae by the following combination of unique (1 to 5) and shared (6 to 16) characters: (1) tooth plates associated with vomer isolated and very distant from each other; (2) lachrymal thin (fig. 78); (3) anterior part of interopercle compressed with anterior end notched (fig. 79); (4) interopercle subrectangular shaped and elongated (fig. 79); (5) lateral margin of uncinuate process of third epibranchial notched (fig. 80); (6) posterior cranial fontanel absent or reduced to a small opening (fig. 81) [shared with *Bagre*, *Brustiarius*, *Cathorops* (with exception of *C. dasycephalus*), *Galeichthys*, *Genidens* and *Netuma*]; (7) orbitosphenoid laterally expanded [shared with *Arius*, *Brustiarius*, *Carlarius*, *Cinetodus*, *Genidens*, *Netuma*, *Notarius planiceps*, *Potamosilurus* (with exception of *P. latirostris*) and *Sciades* (with exception of *S. couma*, *S. emphysetus*, *S. passany*, *S. proops*, *S. seemanni* and *S. sagor*)]; (8) anterior edge of opercle straight (fig. 79) (shared with *Cathorops*); (9) posteroventral portion of opercle little pronounced posteriorly [shared with *Bagre panamensis*, *Carlarius* (with exception of *C. heudelotii*), *Galeichthys*, *Genidens*, *Ketengus* and *Sciades* (with exception of *S. couma* and *S. felis*)]; (10) posterior margin of interopercle angulated (fig. 79) (shared with *Cathorops*); (11) hyomandibular upper crest long and low (shared with *Brustiarius*, *Carlarius*, *Cephalocassis*, *Cinetodus*, *Cochlefelis*, *Cryptarius*, *Doiichthys*, *Genidens*, *Nemapteryx*, *Neoarius*, *Netuma thalassinus*, *Pachyula*, *Potamarius* and *Sciades*); (12) first pharyngobranchial well developed, subrectangular and depressed (fig. 82) (shared with *Cathorops dasycephalus*, *Cryptarius* and

Pachyula); (13) posterior face of first epibranchial with a prominent process (fig. 82) (shared with *Pachyula*); (14) 15 or more ribs present (shared with *Bagre*, *Carlarius*, *Cochlefelis*, *Genidens*, *Neoarius*, *Netuma*, *Notarius* and *Sciades*); (15) base of adipose fin very short, less than one-half as long as anal-fin base (shared with *Bagre*, *Brustiarius*, *Cathorops*, *Cryptarius* and *Netuma*); (16) origin of adipose fin located vertically above posterior half of anal fin (shared with *Bagre*, *Brustiarius* and *Netuma*).

The distinction of *Plicofollis* is also supported by four unique characters within the Ariidae, not present in *P. platystomus* and *Plicofollis tenuispinis*: lateral ethmoid expanded (fig. 81); vomer oval shaped (fig. 83); lateral processes of vomer very short (fig. 83); uncinat process of third pharyngobranchial longer and wider than mesial portion of epibranchial (fig. 80).



FIGURE 77. *Plicofollis argyropleuron*, USNM 297120, 145 mm TL. Lateral view.

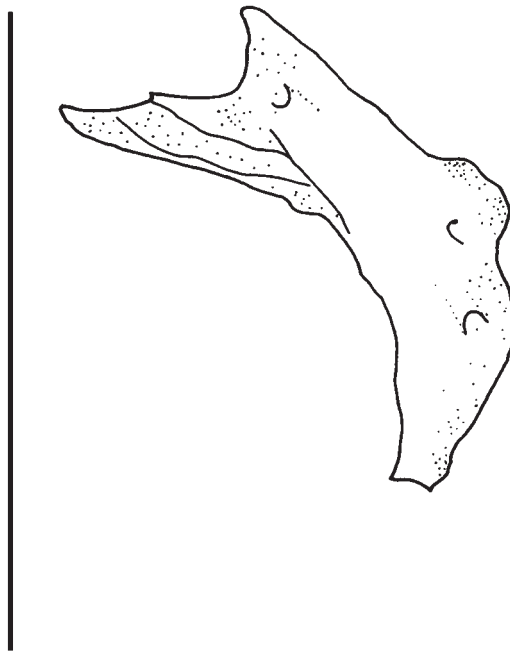


FIGURE 78. *Plicofollis dussumieri*, LACM 38131-48. Dorsal view of lachrymal. Scale bar = 4 mm.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; a small fenestra limited by lateral ethmoid and frontal bones scarcely visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel in many cases closing entirely during ontogenetic growth; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital invading dorsal portion of cephalic shield (except in *C. tenuispinis* and *C. platystomus*); occipital process triangular, moderately long and large, narrowing continuously toward its posterior end, its lateral margins convex; anterior

and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; accessory tooth plates longitudinally elongated, bearing molar-like teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin very short, less than one-half length of anal-fin base; lateral line bifurcated at caudal region, reaching base of caudal-fin upper and lower lobes; cleithrum wide, with second dorsal process on its upper portion; posterior cleithral process moderately long and distinct from second dorsal process of cleithrum.

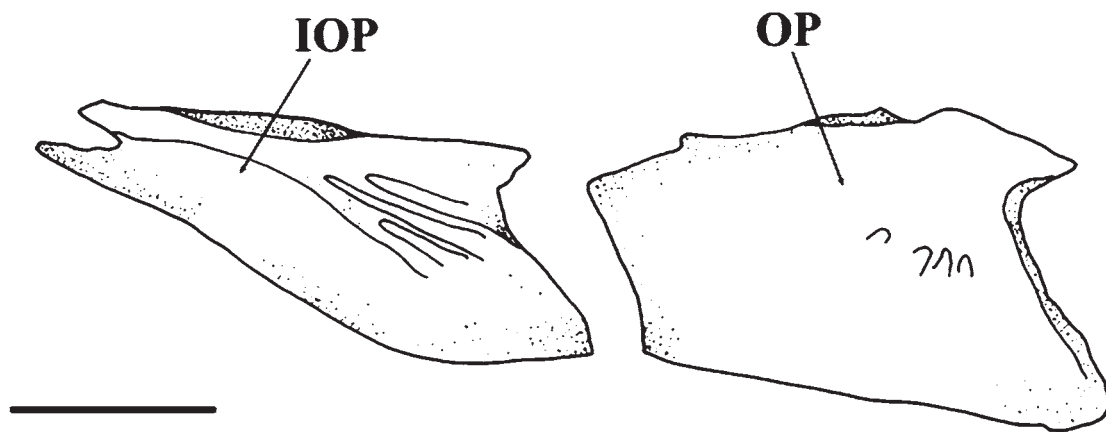


FIGURE 79. *Plicofollis dussumieri*, LACM 38131-48. Lateral view of interopercle and opercle. Scale bar = 4 mm. **IOP** — interopercle; **OP** — opercle.

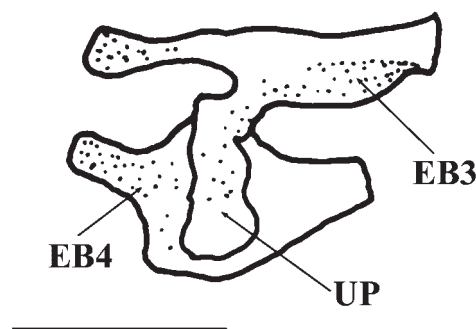


FIGURE 80. *Plicofollis dussumieri*, LACM 38131-48. Ventral view of third and fourth epibranchials. Scale bar = 4 mm. **EB3** — third epibranchial; **EB4** — fourth epibranchial; **UP** — uncinat process.

Remarks. The genus is defined by characters shared by all the species directly examined, except *P. platystomus* (Day, 1877). The inclusion of this species is preliminary and supported by a series of characters shared between *P. platystomus* and all other members of the genus: parasphenoid wide in ventral view (shared with *Amphiarius*, *Aspistor*, *Brustarius*, *Cochlefelis*, *Hemiaris*, *Notarius*, *Sciades couma*, *S. emphysetus*, *S. herzbergii*, *S. passany* and *S. proops*); maxilla with the margins parallel in the proximal 2/3, slightly narrower in the distal 1/3 and posteriorly truncate (shared with *Carlarius heudelotii*, *Genidens*, *Netuma thalassinus* and *Sciades platypogon*); metapterygoid longer than deeper [shared with *Cathorops* (with exception of *Cathorops dasycephalus*), *Cephalocassis*, *Cinetodus*, *Cryptarius*, *Pachyula* and *Potamarius*]; anterior process of metapterygoid truncate [shared with *Cinetodus*, *Cochlefelis*, *Pachyula*, *Potamarius* and *Potamosilurus* (with exception of *P. velutinus*)]; mesial portion of ceratohyal well developed; urohyal lateral processes 1/3 as long as medial process; posterior portion of second basibranchial short and robust (shared with *Arius gagara*, *A. maculatus* and *Aspistor*).

Skeleton preparations of *Arius argyroleuron* Kuhl & van Hasselt, 1840, type-species of the genus and also of *P. crossocheilios* (Bleeker, 1846) and *P. magatensis* (Herre, 1926) were not examined and their recogni-

tion as members of *Plicofollis* is based on the supplementary morphological characters observed in preserved specimens and data from the literature.

Distribution and habitat. Eastern Africa, south and southeast Asia, southern New Guinea and northern Australia, marine and brackish waters.

***Plicofollis argyroleuron* (Kuhl & van Hasselt, 1840)**

(fig. 77)

Arius argyroleuron Valenciennes (ex Kuhl & van Hasselt) in Cuvier & Valenciennes, 1840b: 104. Type locality: Java, Indonesia. Holotype: RMNH 3041.

Arius macrocephalus Bleeker, 1846: 167. Type locality: Jakarta, Java, Indonesia. Syntypes: BMNH 1863.12.4.48; RMNH 6896.

Arius acutus Bleeker, 1846: 167. Type locality: Jakarta, Java, Indonesia. Syntypes: BMNH 1863.12.4.67; RMNH 15975; SMNS 10566.

Arius hamiltonis Bleeker, 1846: 291. Type locality: unknown. Syntypes: RMNH 6895.

Arius schlegeli Bleeker, 1863: 146 (in part). Type locality: Amoy, China. Syntypes: AMS B.8123.

Tachysurus broadbenti Ogilby, 1908: 8. Type locality: Cape York, Queensland, Australia. Syntypes: QM I.9745-46.

Hemipimelodus colcloughi Ogilby, 1910: 7. Type locality: Croker Island, Northern Territory, Australia. Holotype: QM I.1538.

Arius satparanus Chaudhuri, 1916: 430, figs. 6–8. Type locality: Channel between Satpara and Barnikuda, Chilka Lake, Orissa, India. Holotype: ZSI F8784/1.

Distribution: South and southeast Asia, southern New Guinea and northern Australia.

Countries: India, Thailand, Indonesia, Malaysia, Philippines, Papua New Guinea, Australia.

Habitat: Marine and brackish waters.

Maximum size: 500 mm TL.

Material examined: USNM 297120 (2 al, 160–235 mm TL), India, Madras state; gulf of Mannar, ca. 12 mi, sse of Tuticorin.

***Plicofollis crossocheilos* (Bleeker, 1846)**

Arius crossocheilos Bleeker, 1846: 172. Type locality: Jakarta, Java, Indonesia. Syntypes: RMNH 6894.

Arius tonggol Bleeker, 1846: 292. Type locality: Jakarta, Java, Indonesia. Syntypes: BMNH 1863.12.4.56; RMNH 6894.

Distribution: South and southeast Asia.

Countries: India, Singapore, Indonesia, Malaysia and Philippines.

Habitat: Brackish waters.

Maximum size: 380 mm TL.

***Plicofollis dussumieri* (Valenciennes, 1840)**

Arius dussumieri Valenciennes in Cuvier & Valenciennes, 1840b: 84. Type locality: Malabar, India. Holotype: MNHN A-9401.

Arius goniaspis Bleeker, 1858: 44. Type locality: Priamam, western Sumatra, Indonesia. Syntypes: BMNH 1864.1.9.54.

Distribution: Eastern Africa and south and southeast Asia.

Countries: Madagascar, Mozambique, Tanzania, Kenya, Somalia, Ethiopia, Oman, Pakistan, India, Sri Lanka, Bangladesh, Myanmar, Thailand, Malaysia and Indonesia.

Habitat: Marine and brackish waters.

Maximum size: 750 mm TL.

Material examined: AMNH 32823 (3 al, 217-257 mm TL), Kenya, Mombasa; LACM 38131-48 (2 al, 173-200 mm TL) (1 c&s), Pakistan, Sind, 6-8 km south of Hajambro, Turshian Creek; USNM 297118 (3 al, 265-295 mm TL), Madagascar, northwestern coast of Madagascar, baie d'Amboro.

***Plicofollis magatensis* (Herre, 1926)**

Arius magatensis Herre, 1926: 396, pl. 1 (fig. 1). Type locality: Magat River at Bagabag, Nueva Vizcaya, Luzon I., Philippines. Syntypes: BSMP, presumed destroyed.

Distribution: Southeast Asia.

Countries: Philippines.

Habitat: Freshwater.

Maximum size: 450 mm TL.

Material examined: CAS 113650 (2 al, 310-370 mm TL), Philippines, Nueva Vizcaya prov. Magat River, Bayombong.

***Plicofollis nella* (Valenciennes, 1840)**

Pimelodus nella Valenciennes in Cuvier & Valenciennes, 1840b: 162. Type locality: Vishakpatnam, India.

Arius leiotocephalus Bleeker, 1846: 292. Type locality: Jakarta, Java, Indonesia. Syntypes: RMNH 5277, 16011.

Bagrus (Ariodes) meyenii Müller & Troschel, 1849: 9. Type locality: unknown. Holotype: ZMB 3002.

Distribution: South and southeast Asia, southern New Guinea and northern Australia.

Countries: Thailand, Singapore, Malaysia, Vietnam, China, Indonesia, Philippines, Papua New Guinea and Australia.

Habitat: Marine and brackish waters.

Maximum size: 340 mm TL.

Material examined: UMMZ 214647 (5 al, 140-171 mm TL) (1 c&s), Vietnam, south China Sea, Paknam sta. 9A, 34 km SE of Bac Lieu province, Mekong River plume.

***Plicofollis platystomus* (Day, 1877)**

Arius platystomus Day, 1877: 464, pl. 107 (fig. 3). Type locality: Canara, India. Holotype: ZSI 1306.

Distribution: South and southeast Asia.

Countries: India, Sri Lanka and Bangladesh.

Habitat: Marine and brackish waters.

Maximum size: 310 mm TL.

Material examined: UMMZ. 208845 (3, 146-160 mm TL) (1 c&s), Bangladesh, Chittagong, bay of Bengal, just off Kutubdia Island

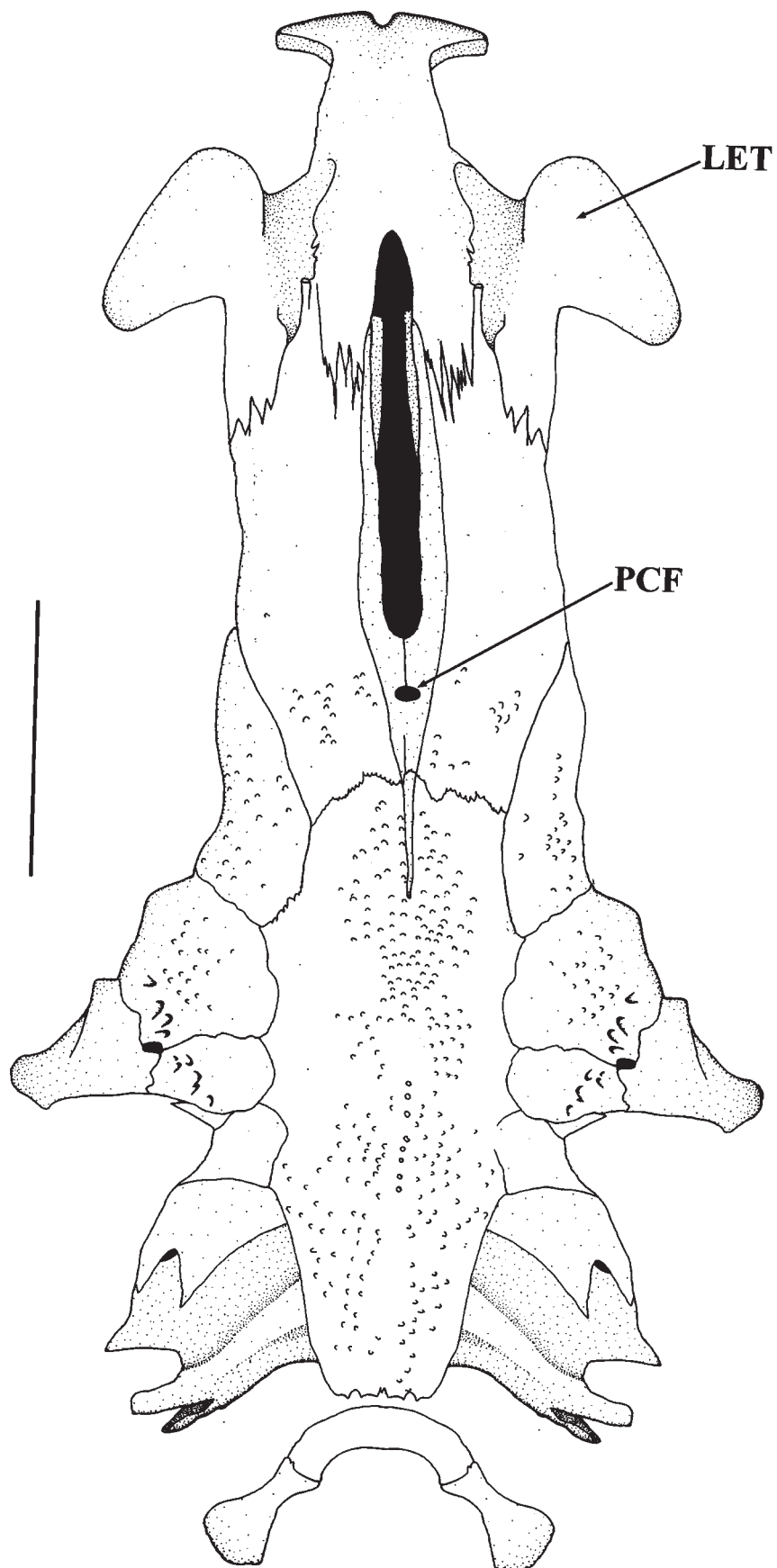


FIGURE 81. *Plicofollis dussumieri*, LACM 38131-48. Dorsal view of neurocranium. Scale bar = 10 mm. **LET** — lateral ethmoid; **PCF** — posterior cranial fontanel.

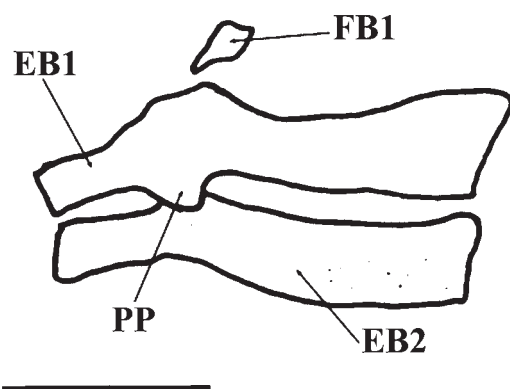


FIGURE 82. *Plicofollis dussumieri*, LACM 38131-48. Ventral view of first and second epibranchials and first pharyngobranchial. Scale bar = 4 mm. **EB1** — first epibranchial; **EB2** — second epibranchials; **FB1** — first pharyngobranchial; **PP** — posterior process.

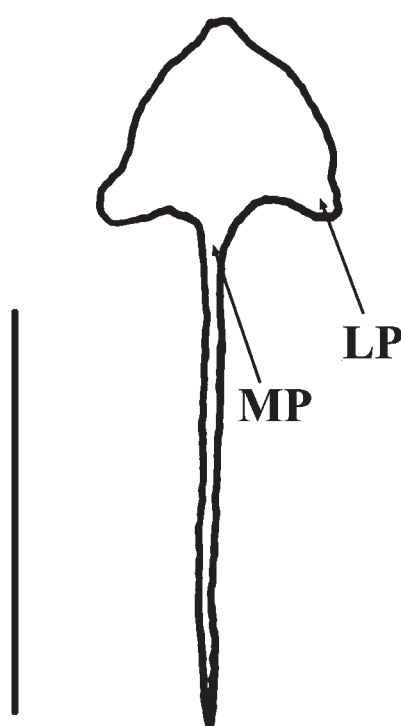


FIGURE 83. *Plicofollis dussumieri*, LACM 38131-48. Ventral view of vomer. Scale bar = 4 mm. **LP** — lateral process; **MP** — medial process.

***Plicofollis polystaphylodon* (Bleeker, 1846)**

Arius polystaphylodon Bleeker, 1846: 172. Type locality: Jakarta, Java Indonesia. Syntypes: BMNH 1863.12.4.98.

Distribution: South and southeast Asia and southern New Guinea.

Countries: Malagasy Republic, Singapore, Indonesia and Papua New Guinea.

Habitat: Marine and brackish waters.

Maximum size: 340 mm TL.

Material examined: AMS I.27412-001 (1 c&s), Indonesia, Jarkarta, Muarakarang; AMNH 88024 (12 al, 93-115 mm TL) (1 c&s), Malagasy Republic, Madagascar, Mananjary, estuary of Mananjary River, side

lagoon behind hotel Jardin de la Mer, ca. 100 meters from sea; USNM 138376 (3 al, 205-235 mm TL), Indonesia, Celebes, Makassar River.

***Plicofollis tenuispinis* (Day, 1877)**

?*Arius layardi* Günther, 1866: 474 [2], pl. 15. Type locality: Sri Lanka. Holotype: BMNH 1866.7.13.13

Arius tenuispinis Day, 1877: 466, pl. 107 (fig. 5). Type locality: Bombay, India. Holotype: ZSI F482.

Distribution: Eastern Africa and South and southeast Asia.

Countries: Pakistan, India and Malaysia.

Habitat: Marine and brackish waters.

Maximum size: 380 mm TL.

Material examined: CAS 127670 (1 al, 186 mm TL), Malaysia, Sabah state, Sandakan; LACM 38128-47 (7 al, 190-226 mm TL) (1 c&s), Pakistan, Sind, Hawkes Bay, west of Karachi; LACM 38130-80 (13 al, 131-226 mm TL) (1 c&s), Pakistan, Sind, 20 Km south of Paitiani, creek north of mouth of Turshian Creek.

***Potamarius* Hubbs & Miller, 1960**

(Fig. 84)

Potamarius Hubbs & Miller, 1960: 101. Type species: *Conorhynchus nelsoni* Evermann & Goldsborough, 1902. Type by original designation. Gender: masculine.

Diagnosis. The following combination of exclusive (1 to 3) and shared (4 to 14) characters distinguishes *Potamarius* from the remaining ariid genera: (1) optic foramen very large; (2) interopercle subrectangular (fig. 85); (3) lateral processes of urohyal completely free from bony blade contacting medial process of the bone (fig. 86); (4) mesethmoid median portion thin (fig. 87) [shared with *Arius* (with exception of *A. caelatus* and *A. madagascariensis*), *Cathorops*, *Cephalocassis*, *Cinetodus*, *Ketengus*, *Osteogeneiosus* and *Pachyula*]; (5) lateral horn of lateral ethmoid very long and pointing backward (fig. 87) [shared with *Arius* (with exception of *Arius caelatus*), *Doiichthys* and *Plicofollis* (with exception of *P. platystomus* and *Plicofollis tenuispinis*)]; (6) anterior portion of vomer acute and conspicuous [shared with *Amphiarius*, *Arius*, *Aspistor*, *Cephalocassis*, *Cinetodus*, *Osteogeneiosus*, *Plicofollis*, *Notarius* (with exception of *N. planiceps*), *Pachyula* and *Potamosilurus macrorhynchus*]; (7) vomerine tooth plate absent [shared with *Amphiarius*, *Arius*, *Batrachocephalus*, *Carlarius*, *Cathorops* (with exception of *C. dasycephalus*), *Cephalocassis*, *Cinetodus*, *Cryptarius*, *Doiichthys*, *Genidens genidens*, *Ketengus*, *Nedystoma*, *Osteogeneiosus*, *Pachyula*, *Plicofollis platystomus* and *Potamosilurus velutinus*]; (8) frontal bones without mesial laminar projection (fig. 87) (shared with *Amphiarius*, *Arius*, *Aspistor*, *Cathorops*, *Cephalocassis*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Hemiaris*, *Nedystoma*, *Nemapteryx*, *Osteogeneiosus* and *Potamosilurus latirostris*); (9) orbitosphenoid without lateral expansion [shared with *Amphiarius*, *Aspistor*, *Bagre*, *Batrachocephalus*, *Cathorops*, *Cephalocassis*, *Cochlefelis*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Hemiaris*, *Ketengus*, *Nedystoma*, *Nemapteryx*, *Neoarius*, *Osteogeneiosus*, *Notarius* (with exception of *N. planiceps*), *Pachyula*, *Plicofollis platystomus*, *Potamosilurus latirostris*, *Sciades couma*, *S. emphysetus*, *S. passany*, *S. proops*, *S. seemanni* and *S. sagor*]; (10) parasphenoid wing-like process absent (shared with *Batrachocephalus*, *Cephalocassis*, *Cryptarius*, *Doiichthys*, *Ketengus*, *Nedystoma*, *Nemapteryx* and *Osteogeneiosus*); (11) premaxillary almost as long as wide (shared with *Cathorops*, *Cephalocassis* and *Cinetodus*); (12) metapterygoid 1.5 times as long as high [shared with *Cathorops* (with exception of *Cathorops dasycephalus*), *Cephalocassis*, *Cinetodus*, *Cryptarius*, *Pachyula* and *Plicofollis*]; (13) metapterygoid anterior process truncate [shared with *Cinetodus*, *Cochlefelis*, *Pachyula*, *Plicofollis* and *Potamosilurus* (with exception of *P. velutinus*)]; (14) distance from optic foramen and trigeminofacial complex equal to

width of complex (shared with *Bagre* and *Galeichthys*); (15) third basibranchial in form of a long and thin hourglass (shared with *Cochlefelis* and *Galeichthys*); (16) number of ribs equal to or less than 14 (shared with *Amphiarius*, *Arius*, *Aspistor*, *Batrachocephalus*, *Brustarius*, *Cathorops*, *Cephalocassis*, *Cinetodus*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Hemiarus*, *Ketengus*, *Nedystoma*, *Nemapteryx*, *Osteogeneiosus*, *Pachyula*, *Plicofollis platystomus* and *Potamosilurus*).



FIGURE 84. *Potamarius nelsoni*, AMNH 25684, 214 mm TL. Lateral view.

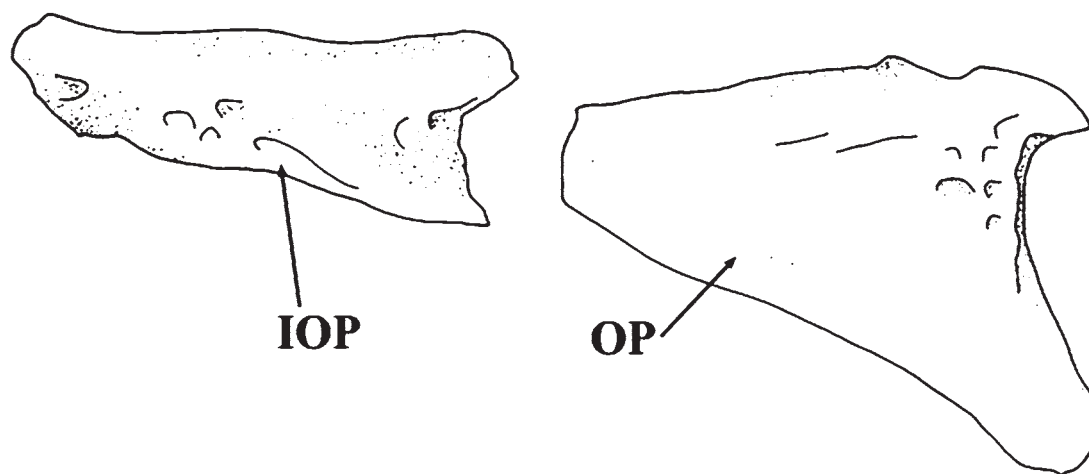


FIGURE 85. *Potamarius izabalensis*, UMMZ 177252. Lateral view of interopercle and opercle. Scale bar = 4 mm. **IOP** — interopercle; **OP** — opercle.

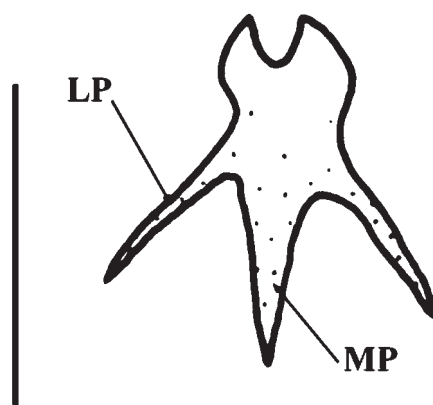


FIGURE 86. *Potamarius grandoculis*, MZUSP 1004-114. Lateral view of urohyal. Scale bar = 4 mm. **LP** — lateral process; **MP** — medial process.

Supplementary morphological characters. Cephalic shield granulated visible under the skin; a moderately developed fenestra limited by lateral ethmoid and frontal visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital; posterior cranial fontanel moderately developed, long and narrow; fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, moderately long and wide, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer absent; accessory tooth plates absent or rudimentary; maxillary barbel fleshy and cylindrical; base of adipose fin moderately long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching base of caudal-fin upper lobe; cleithrum wide, with second dorsal process on its upper portion; posterior cleithral process of moderate length, distinct from second dorsal process of cleithrum.

Remarks. The type-species of the genus, *Conorhynchos nelsoni* Evermann & Goldsborough, 1902 was characterized on the basis of characters observed in preserved specimens and data from the literature.

Distribution and habitat. Central and South America, freshwater.

***Potamarius grandoculis* (Steindachner, 1877)**

Arius grandoculis Steindachner, 1877: 644, pl. 11. Type locality: Rio Doce, southeastern Brazil. Holotype: NMW 48272.

Distribution: Rios Doce and Paraíba do Sul.

Countries: Brazil

Habitat: Freshwaters.

Maximum size: 350 mm TL.

Material examined: MZUSP 1004-114 (11 al) (1 c&s and 1 es), Brazil, Espírito Santo, Linhares, lagoa Japurunã.

***Potamarius izabalensis* Hubbs & Miller, 1960**

Potamarius izabalensis Hubbs & Miller, 1960: 104, figs. 1-4. Type locality: Lago de Izabal, 1 mile west of El Paraíso, Guatemala. Holotype: USNM 134347. Paratypes: UMMZ 177251-52, 114500, 134346, 134348 and 179837.

Distribution: Lake Izabal and possibly Polochic River.

Countries: Guatemala.

Habitat: Freshwater.

Maximum size: 440 mm TL.

Material examined: UMMZ 177251 (1 al), Guatemala, lago Izabal near the mouth of rio Polochic; UMMZ 177252 (1 c&s), Guatemala, lago Izabal.

***Potamarius nelsoni* (Evermann & Goldsborough, 1902)**

(fig. 84)

Conorhynchos nelsoni Evermann & Goldsborough, 1902: 140, fig. 1. Type locality: río Usumacinta, Montecristo, Yucatán, Mexico. Holotype: USNM 50001. Paratypes: USNM 52963.

Distribution: Usumacinta River basin.

Countries: Mexico and Guatemala.

Habitat: Freshwater.

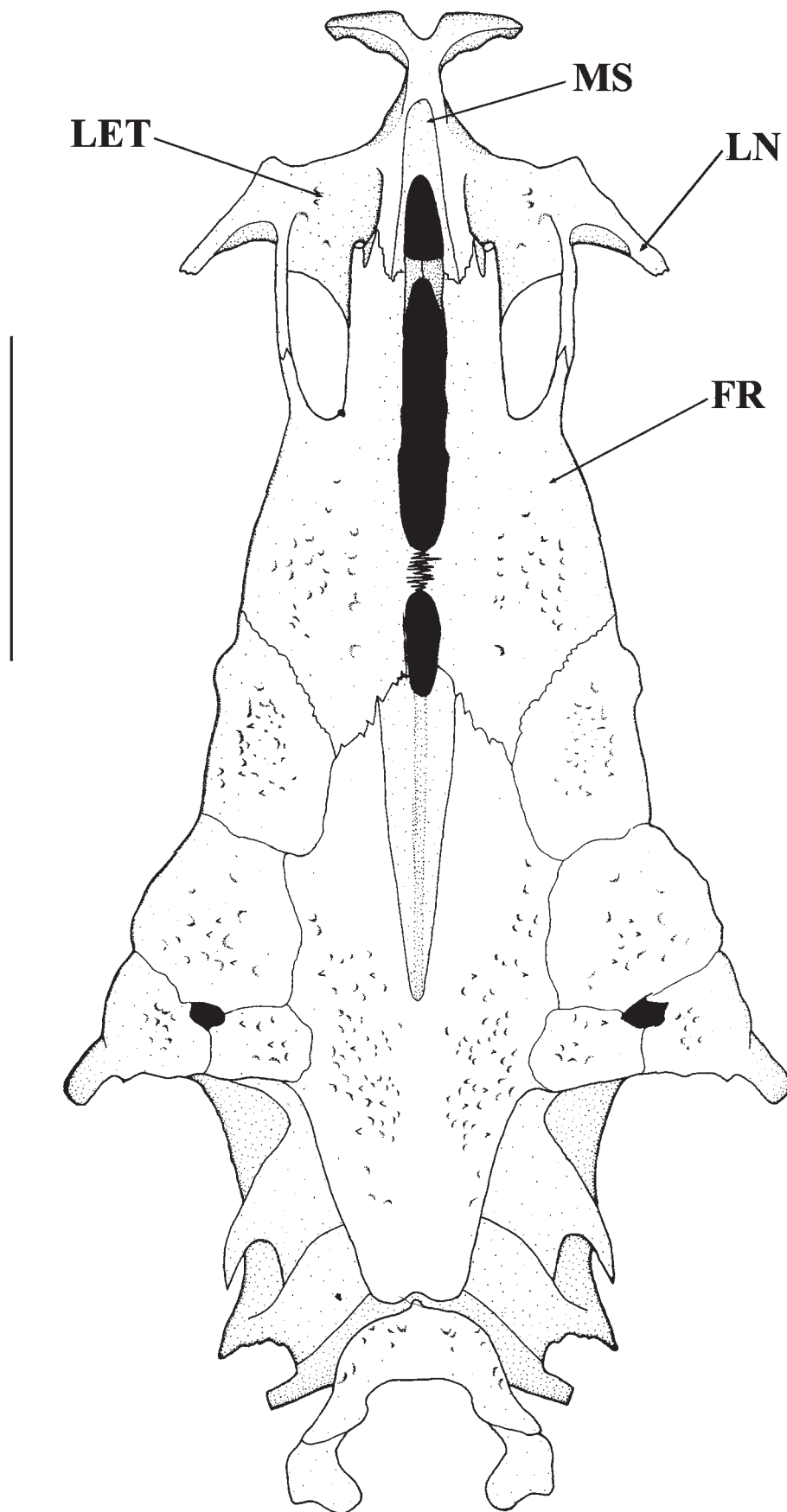


FIGURE 87. *Potamarius izabalensis*, UMMZ 177252. Dorsal view of neurocranium. Scale bar = 10 mm. **FR** — frontal; **LET** — lateral ethmoid; **LN** — lateral horn; **MS** — mesethmoid.

Maximum size: 390 mm TL.

Material examined: AMNH 25684 (2 al, 217-233 mm TL), Guatemala, Peten, rio de la Passion, Altos de los Sacrificios.

Species inquirendae

Arius labiatus Boulenger, 1898: 6. Type locality: Río Peripa, Ecuador. Holotype: MZUT 1540.

Hexanemichthys henni Eigenmann, 1922: 30, fig. 9. Type locality: Río Daule, Colimes, west Ecuador. Holotype: CAS 60620 and Paratypes: CAS 60621.

***Potamosilurus* new genus**

(fig. 88)

Type species: *Hemipimelodus macrorhynchus* Weber, 1913.

Diagnosis. The combination of the following shared characters distinguishes *Potamosilurus* from all other members of the Ariidae: (1) wing-like process of parasphenoid formed by a single long and thin process [shared with *Amphiarius*, *Aspistor*, *Bagre*, *Cathorops* (with exception of *C. dasycephalus*), *Cochlefelis*, *Hemiaris*, *Notarius* (with exception of *N. planiceps*), *Pachyula*, *Plicofollis platystomus*, *Potamarius*, *Sciades emphysetus*, *S. passany* and *S. proops*]; (2) metapterygoid anterior process truncate (shared with *Cinetodus*, *Cochlefelis*, *Pachyula*, *Plicofollis* and *Potamarius*); (3) tip of uncinat process of third epibranchial pointed (shared with *Cephalocassis*, *Cinetodus*, *Doiichthys*, *Galeichthys*, *Hemiaris stormii*, *Nedystoma* and *Pachyula*).

Supplementary morphological characters. Cephalic shield granulated visible under the skin; lateral ethmoid and frontal limiting a moderately developed fenestra visible under the skin; medial groove of neurocranium very distinct, limited by frontal bones and/or on supraoccipital (except in *P. latirostris*); posterior cranial fontanel moderately developed, long and narrow (except in *P. latirostris*); fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular relatively large; epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, moderately long and wide, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect; tooth plates associated with vomer absent (except in *P. latirostris*); accessory tooth plates absent (except in *P. latirostris*); maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching caudal-fin upper lobe; cleithrum wide, with second process on its upper portion; posterior cleithral process moderately long and distinct from dorsal process of cleithrum.

Remarks. Marceniuk (2003) hypothesizes that *Potamosilurus macrorhynchus* and *P. latirostris* form a monophyletic unit. In the present study five freshwater species from New Guinea are included in the genus. The inclusion of *P. coatesi* (Kailola, 1990) and *P. robertsi* (Kailola, 1990) is based on the presence of diagnostic characters depicted from the literature, since these species were not examined and *P. velutinus* (Weber, 1907) was tentatively assigned to the genus, but it needs to be confirmed as it is based only on supplementary morphological characters. In Kailola (2004) these species are considered to belong in *Arius* or in *Ariopsis* (herein considered synonymous with *Sciades*). All *Potamosilurus* species can be distinguished from the species belonging in *Arius* by the absence of accessory tooth plates (with exception of *P. latirostris*) and by the lateral line not bifurcated at caudal region, reaching caudal-fin upper lobe and from members of *Sciades* (= *Ariopsis*) by having the large fenestra visible under the skin limited by the lateral ethmoid and frontal bones, the posterior cranial fontanel conspicuous and the fossa limited by pterotic, supracleithrum and extrascapular

large (see also diagnosis of the genus).

Distribution and habitat. Southern New Guinea, freshwaters.

Etymology. The first part of the generic name *potamo* is from the Greek word potamos meaning river, and *silurus* is from Latin, a generic name applied in the past to many catfish taxa, alluding to the fact that all the included species are from freshwater. Gender: masculine.



FIGURE 88. *Potamosilurus macrorhynchus*, Roberts, 1978. Lateral view.

***Potamosilurus coatesi* (Kailola, 1990)**

Arius coatesi Kailola, 1990: 18, fig. 5. Type locality: market at Angoram, Sepik River, Papua New Guinea. Holotype: AMS I.25405-001. Paratypes: AMS I.25405-002, KFRS F03995, F04108, QM I.21673, WAM P. 28221-001.

Distribution: New Guinea.

Countries: Papua New Guinea.

Habitat: Freshwaters.

Maximum size: 660 mm SL.

***Potamosilurus latirostris* (Macleay, 1883)**

Arius latirostris Macleay, 1883: 277. Type locality: Goldie River, Papua New Guinea. Syntypes: AMS I.9072-74, I.9127, I.13398.

Arius acrocephalus Weber, 1913: 543, figs. 20-21. Type locality: Bibis River, Regen Island, Alkmaar and Lorentz rivers, Irian Jaya, Indonesia. Syntypes: AMNH 9514 [ex ZMA 111090], ZMA 111087-90.

Arius digulensis Hardenberg, 1936: 369. Type locality: middle course of Digul River, south New Guinea. Holotype: ZMA 110781.

Distribution: Southern New Guinea.

Countries: Indonesia and Papua New Guinea.

Habitat: Freshwaters.

Maximum size: 660 mm SL.

Material examined: AMS I.30113-001 (1 c&s), Papua New Guinea, Laloki River; AMNH 58712 (11 al, 75-98 mm TL), Papua New Guinea, western OK Tedi River at Ningerum; USNM 210858 (6 al, 194-254 mm TL), Papua New Guinea, Papua-central dist Laloki drainage Laloki River at Kokoda trail motel; MZUSP 38655 (4 al) (1 c&s), Papua New Guinea, Tedi River, near Ningerum.

***Potamosilurus macrorhynchus* (Weber, 1913)**

(fig. 88)

Hemipimelodus macrorhynchus Weber, 1913: 549, fig. 27. Type locality: Lorentz River, van Weelskamp, Bivak River and Alkmaar, New Guinea. Syntypes: ZMA 111085-86.

Hemipimelodus aaldereni Hardenberg, 1936: 367. Type locality: middle course of Digul River, south New Guinea. Holotype: ZMA 110782.

Distribution: Southern New Guinea.

Countries: Indonesia and Papua New Guinea.

Habitat: Freshwater.

Maximum size: 463 mm SL.

Material examined: AMS I.25998-002 (1 c&s), Papua New Guinea., Purari River, Kone, Wabo Dam site.

***Potamosilurus robertsi* (Kailola, 1990)**

Hemipimelodus taylori Roberts, 1978: 40, figs. 19, 20. Type locality: Upper Fly River, Papua, New Guinea, 6°46'48"S, 141°36'36"E. Holotype: AMS 27087-001 [ex USNM 217076]. Paratypes: KFRS 682.01 [ex USNM 217077], USNM 217077.

Arius robertsi Kailola, 1990: 24. Replacement name for *Hemipimelodus taylori* Roberts, 1978, secondarily preoccupied by *Arius taylori* Hildebrand, 1925.

Distribution: Southern New Guinea.

Countries: Papua New Guinea.

Habitat: Freshwaters.

Maximum size: 350 mm SL.

***Potamosilurus velutinus* (Weber, 1907)**

Hemipimelodus velutinus Weber, 1907: 225. Type locality: Lake Sentani and mouth of Tami and Twarin rivers, Irian Jaya, Indonesia. Syntypes: AMNH 9478, FMNH 53592, NMW 8222-23, RMNH 8001, ZMA 112654-56.

Hemipimelodus papillifer Herre, 1935: 390. Type locality: Sepik River at Timbuke, New Guinea. Holotype: FMNH 17211. Paratypes: FMNH 17212, SU 24453.

Distribution: Northern New Guinea.

Countries: Indonesia and Papua New Guinea.

Habitat: Freshwaters.

Maximum size: 500 mm SL.

Material examined: AMS I.27410-001 (1 c&s), Papua New Guinea, Angoran, Sepik River, fish market; CAS 63536 (3 al, 67-235 mm TL), Papua New Guinea, Madang, Ramu River where it is crossed by bridge on Brahman rd. north side near Usema village; freshwater; elev. 125m; CAS 63411 (4 al, 212-228 mm TL) (1 c&s), Papua New Guinea, Madang, just south of boat launch area, Bunapas Mission, 45 km upstream, elev. 5m; USNM 217321 (3 al, 187-230 mm TL), Papua New Guinea, Ramu River near Mt Otto.

***Sciades* Müller & Troschel, 1849**

(fig. 89)

Sciades Müller & Troschel, 1849: 6. Type species: *Bagrus* (*Sciades*) *emphysetus* Müller & Troschel, 1849. Type by subsequent designation. Type apparently designated first by Bleeker 1862: 8 (subgenus of *Bagrus*). Gender: masculine.

Hexanematichthys Bleeker, 1858: 61, 126. Type species: *Bagrus sondaicus* Valenciennes, 1840. Type by monotypy. Gender: masculine.

Sciadeichthys Bleeker, 1858: 62, 66. Type species: *Bagrus (Sciades) emphysetus* Müller & Troschel, 1849. Type by monotypy. Gender: masculine.

Selenaspis Bleeker, 1858: 62. Type species: *Silurus herzbergii* Bloch, 1794. Type by subsequent designation by Jordan & Evermann (1896: 119). Gender: feminine.

Ariopsis Gill, 1861: 56. Type species: *Arius milberti* Valenciennes, 1840. Type by monotypy. Gender: feminine.

Leptarius Gill, 1863: 170. Type species: *Leptarius dowii* Gill, 1863. Type by monotypy. Gender: masculine.



FIGURE 89. *Sciades emphysetus*, USNM 215204, 193 mm TL. Lateral view.

Diagnosis. The species of *Sciades* can be differentiated from all other genera of the Ariidae by the combination of the following exclusive (1 to 5) and shared (6 to 8) characters: (1) medial groove of neurocranium delimited mostly or exclusively by frontal bones (fig. 90); (2) temporal fossa very reduced or entirely closed during ontogenetic development (fig. 90) (with exception of *Sciades leptaspis*); (3) otic capsules little developed; (4) space between transcapular process and otic capsule very wide; (5) subvertebral process indistinct or little differentiated; (6) posterior cranial fontanel absent (fig. 90) (with exception of *Sciades platypogon* and shared with *Batrachocephalus*); (7) epiphyseal bar indistinct (with exception of *Sciades platypogon* and shared with *Batrachocephalus*); (8) exoccipital posterior process sutured to Muller's ramus (with exception of *Sciades platypogon* and shared with *Potamarius izabalensis*).

Supplementary morphological characters. Cephalic shield conspicuously granulated visible under the skin; lateral ethmoid and frontal limiting a small fenestra not visible under the skin; medial groove of neurocranium limited by frontal bones and/or on supraoccipital distinct or not very distinct; posterior cranial fontanel always closed (except in *S. platypogon*); fenestra limited by supraoccipital, pterotic and sphenotic absent; fossa limited by pterotic, supracleithrum and extrascapular absent (except in *S. leptaspis*); epioccipital not invading dorsal portion of cephalic shield; occipital process triangular, its length and width variable, progressively narrower toward its posterior part; anterior and median nuchal plates fused and indistinct, forming a structure of semi-lunar aspect or broad in form of shield; tooth plates associated with vomer round; accessory tooth plates large, oval shaped or subtriangular, bearing conical teeth; maxillary barbel fleshy and cylindrical; two pairs of mental barbels; base of adipose fin moderately long, about half as long as anal-fin base; lateral line not bifurcated at caudal region, reaching caudal-fin upper lobe (with exception of *S. couma*); cleithrum wide, with second process on its upper portion; posterior cleithral process moderately long and distinct from dorsal process of cleithrum.

Remarks. *Sciades* contains the largest number of ariid species from the eastern and western Americas, south and southeast Asia, southern New Guinea and northern Australia. The nominal genera *Hexanematich-*

thys, *Selenaspis* and *Ariopsis* represented by the respective type-species *Pimelodus sagor* Hamilton, 1822, *Silurus herzbergii* Bloch, 1794 and *Arius milberti* Valenciennes, 1840 (= *Silurus felis* Linnaeus, 1766), are considered junior synonyms of *Sciades*. The genus *Sciades* and *Sciadeichthys* are based on the same type-species, *Bagrus (Sciades) emphysetus* Müller & Troschel, 1849 and the latter is considered an objective synonym of the former. The osteology of *Leptarius dowii* Gill, 1863, the type-species of *Leptarius*, was not examined but morphological information from preserved specimens indicates that this genus is junior synonym of *Sciades*. In addition to *S. mastersi* (Ogilby, 1898), *S. paucus* (Kailola, 2000) and *S. utarus* (Kailola, 1990) were considered to belong in the genus based on the presence of external diagnostic morphological characters available in the literature. The inclusion of *S. sona* (Hamilton, 1822) is only tentative.

The species *Sciades couma* (Valenciennes, 1840), *S. emphysetus*, *S. herzbergii*, *S. passany* (Valenciennes, 1840) and *S. proops* (Valenciennes, 1840), form a subgroup well supported by the following exclusive characters, indicating that they might be considered a separate genus in future studies: lateral margin of premaxillary with a conspicuous concavity; mesopterygoid irregularly shaped (fig. 91); ectopterygoid very elongated (fig. 91); posterior nostrils connected by a groove (with exception of *S. emphysetus* and *S. proops*).

Distribution and habitat. Eastern and western America, south and southeast Asia, southern New Guinea and northern Australia.

***Sciades assimilis* (Günther, 1864)**

Arius assimilis Günther, 1864: 146. Type locality: Lake Izabal, Guatemala. Holotype: BMNH 1864.1.26.98.

Distribution: Western Central America.

Countries: Mexico, Belize, Honduras, Guatemala, Nicaragua, Costa Rica and Panama.

Habitat: Predominantly freshwater, but also in brackish water.

Maximum size: 350 mm TL.

Material examined: AMNH 35070 (6 al, 146-260 mm TL) (1 c&s), Guatemala, Izabal, rio Nimblaja, 1 km above mouth into rio Sarstun; FMNH 103770 (3 al, 300-343 mm TL), Belize, Belizean Beach, 4.5 miles on western Highway; UMMZ 197214 (7 al, 184-252 mm TL) (1 c&s), Guatemala, Izabal, rio Nimblaja, 1 km above mouth in rio Sarstun, 3.5 km (by air) east of Modesto Mendez, elev ca 2 m, Atlantic dr.

***Sciades bonillai* (Miles, 1945)**

Galeichthys bonillai Miles, 1945: 454, figs. 4-4a. Type locality: Rio Magdalena, Honda, Colombia. Holotype: Sec Caza y Pesca, Min. Nat. Econ. Bogotá.

Distribution: Northern South America.

Countries: Colombia and Venezuela.

Habitat: Brackish and freshwaters.

Maximum size: 800 mm TL.

Material examined: USNM 292999 (3 al, 224-266 mm TL) (1 c&s), Colombia, Magdalena, Cienaga Grande de Santa Marta, east side nearse end of highway bridge; USNM 286488 (4 al, 265-339 mm TL), Colombia, among mangroves at boca la Boquilla.

***Sciades couma* (Valenciennes, 1840)**

Bagrus couma Valenciennes in Cuvier & Valenciennes, 1840a: 459. Type locality: Cayenne, French Guiana. Syntypes: MNHN A-9338, Cayenne; A-9339, America.

Sciadeichthys (Selenaspis) walrehti Boeseman, 1954: 60. pl. 3. Type-locality: Surinam. Holotype: RMNH 2141. Paratypes: RMNH 19808-09.

Distribution: North and Eastern South America.

Countries: Venezuela, Guyana, Surinam, French Guiana and Brazil.

Habitat: Predominantly brackish waters.

Maximum size: 960 mm TL.

Material examined: CAS 122460 (6 al, 202-232 mm TL) (1 c&s), Brazil, Pará; FMNH 98033 (5 al, 202-329 mm TL), Guyana, Georgetown market.

***Sciades dowii* (Gill, 1863)**

?*Hexanematichthys hymenorrhinos* Bleeker, 1862: 377. Type Locality: Perhaps Suriname. Holotype: RMNH 3056.

Leptarius dowii Gill, 1863: 171. Type locality: western coast of Central America. Holotype: USNM, not found.

Arius alatus Steindachner, 1877: 569 [19], pl. 6. Type locality: Panama. Holotype: MCZ 7725.

Distribution: Western Central America and northwestern South America.

Countries: Panama, Colombia and Ecuador.

Habitat: Fresh and brackish waters.

Maximum size: 900 mm TL.

Material examined: ANSP 81728 (2 al, 335-352 mm TL), Panama, enseada Honda, Pedro Gonzáles, Perlas Islands; CAS 107052 (3 al, 140-167 mm TL), Panama.

***Sciades emphysetus* Müller & Troschel, 1849**

(fig. 89)

Bagrus (Sciades) emphysetus Müller & Troschel, 1849: 8. Type locality: Surinam. Holotype: ZMB 2990.

Bagrus albicans Valenciennes in Cuvier & Valenciennes, 1840a: 461, pl. 420. Type locality: Cayenne, French Guiana. Holotype: MNHN A-9350.

Arius physacanthus Vaillant, 1899: 155. Type locality: Mahury River, French Guiana. Holotype: MNHN 1899-0058.

Arius clavispinosus Puyo, 1936: 103, fig. 16A. Type locality: Cayenne River, French Guiana. Holotype: MNHN 1936-0163.

Arius bonneti Puyo, 1936: 107, fig. 17b. Type locality: Cayenne River, French Guiana. Holotype: MNHN 1936-0162

Arius despaxi Puyo, 1936: 110, fig. 17d. Type locality: Cayenne River, French Guiana. Holotype: MNHN 1936-0161.

Distribution: North and eastern South America.

Countries: Venezuela, Guyana, Surinam, French Guiana and Brazil.

Habitat: Marine and brackish waters.

Maximum size: 510 mm TL.

Material examined: USNM 215204 (2 al, 193-194 mm TL), Brazil, 01° 04' N 48° 06' W; MZUSP 48524 (1 al), Brazil, Pará, baía de Marajó, cabo Maguari; MZUSP 87699 (1 c&s), Brazil, Maranhão, ilha de São Luís, estreito do Coqueiro.

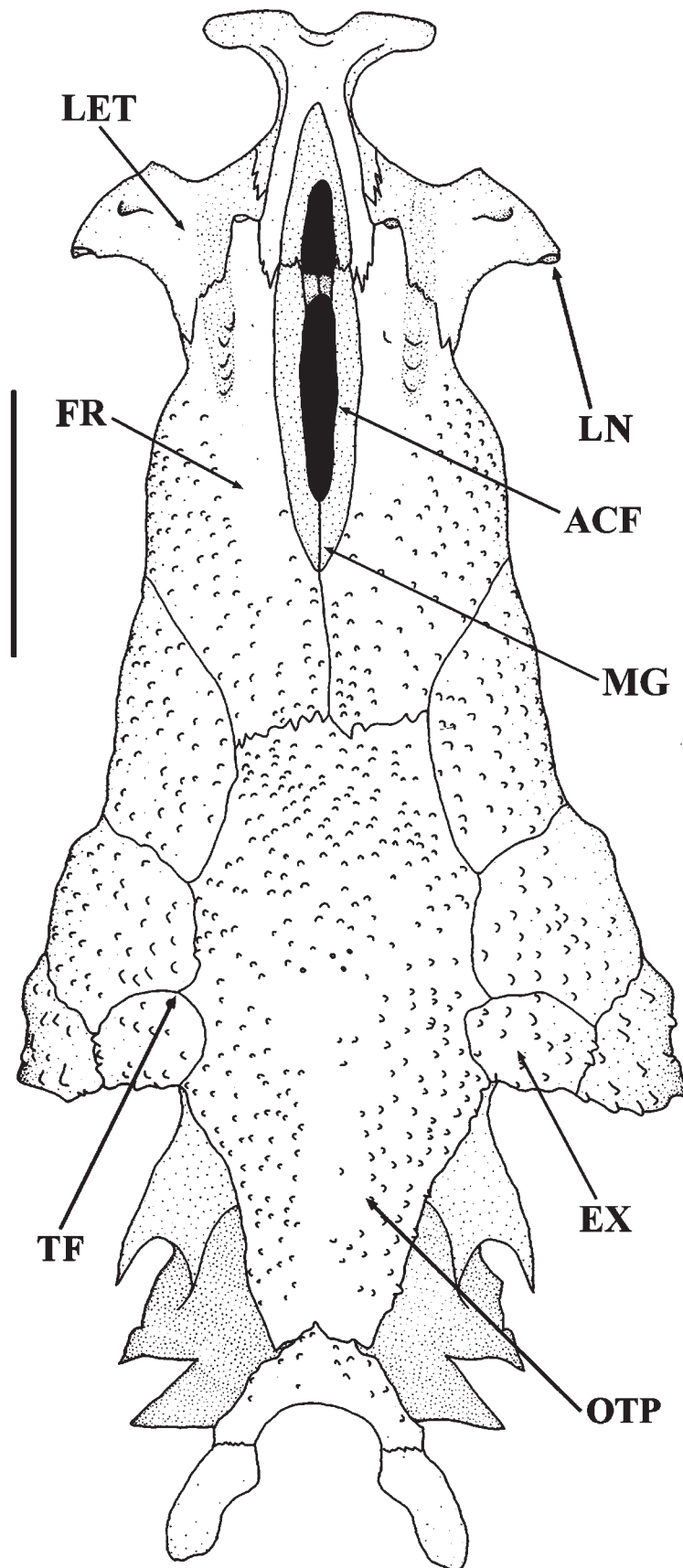


FIGURE 90. *Sciades herzbergii*, MZUSP 51695. Dorsal view of neurocranium. Scale bar = 10 mm. **ACF** — anterior cranial fontanel; **EX** — extrascapular; **FR** — frontal; **LET** — lateral ethmoid; **LN** — lateral horn; **MG** — medial groove of neurocranium; **OTP** — occipital process; **TF** — temporal fossa.

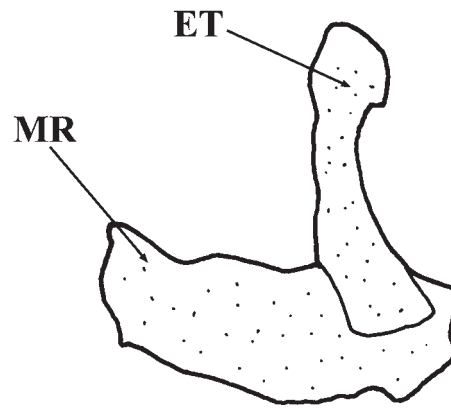


FIGURE 91. *Sciades herzbergii*, MZUSP 51695. Dorsal view of ectopterygoid and mesopterygoid. Scale bar = 4 mm. ET — ectopterygoid; MR — mesopterygoid.

***Sciades felis* (Linnaeus, 1766)**

Silurus felis Linnaeus, 1766: 503. Type locality: Charleston Harbor, South Carolina. U.S.A. Neotype: BMNH 1985.11.11.1.

Arius milberti Valenciennes in Cuvier & Valenciennes, 1840b: 74. Type locality: New York; Charleston, South Carolina, U.S.A. Syntypes: MNHN B-0593, New York.

Arius equestris Baird & Girard, 1854: 26. Type locality: Indianola, Texas, U.S.A.. Holotype: USNM 636.

Galeichthys guentheri Regan, 1907: 124, pl. 16 (fig. 1), 19 (fig. 3). Type locality: Gulf of Mexico. Syntypes: BMNH 1855.9.19.1105-1106.

Distribution: Southeastern North America.

Countries: United States and Mexico.

Habitat: Marine and brackish waters, rarely in fresh waters.

Maximum size: 700 mm TL.

Material examined: AMNH 52073 (7 al, 240-288 mm TL) (1 c&s), U.S.A., Alabama, Mobile, Dauphin Island and Vicinity; AMNH 85099 (6 al, 82-91 mm TL), U.S.A., Alabama, gulf of Mexico, Theodore Ship Channel; FMNH 37916 (4 al, 184-206 mm TL), USA, South Carolina, Charleston Harbor.

***Sciades guatemalensis* (Günther, 1864)**

Arius guatemalensis Günther, 1864: 145. Type locality: Guatemala. Syntypes: BMHN 1853.1.11.6.

Arius caeruleus Günther, 1864: 149. Type locality: Huamucahal, Guatemala. Syntypes: BMNH 1864.1.26.208-209.

Galeichthys azureus Jordan & Williams in Jordan, 1895: 398, pl. 27. Type locality: estuary at Mazatlán, Sinaloa, western Mexico. Holotype: SU 11575.

Distribution: Western Central America.

Countries: Mexico, Guatemala, El Salvador and Nicaragua.

Habitat: Marine and brackish waters.

Maximum size: 370 mm TL.

Material examined: UMMZ 178475 (2 al, 197-274 mm TL) (1 c&s), Mexico, Guerrero, laguna Coyuca, ca 10 mi NW of Acapulco - 3 mi NW of military airport on SW side of the laguna, Pacific dr.

***Sciades herzbergii* (Bloch, 1794)**

Silurus herzbergii Bloch, 1794: 33, pl. 367. Type locality: Surinam. Syntypes: ZMB 2962, 8785.

Pimelodus argenteus Lacépède, 1803: 94, 102. Type locality: Surinam. Syntypes: ZMB 2692, ZMB 8785.

?*Bagrus mesops* Valenciennes in Cuvier & Valenciennes, 1840a: 456. Type locality: Puerto Rico. Holotype: MNHN A-9347.

Bagrus pemecus Valenciennes in Cuvier & Valenciennes, 1840a: 456. Type locality: Cayenne, French Guiana. Holotype: MNHN A-9348.

Bagrus coelestinus Müller & Troschel, 1849: 7. Type locality: Guyana. Syntypes: ZMB 2970, 2977.

Hexanematichthys hymenorrhinos Bleeker, 1862: 377. Type locality: Perhaps Surinam. Holotype: RMNH 3056.

Netuma dubia Bleeker, 1862: 382. Type locality: Surinam. Syntypes: RMNH 3051-52.

Distribution: North and eastern South America.

Countries: Colombia, Venezuela, Guyana, Suriname, French Guiana and Brazil.

Habitat: Marine and brackish waters.

Maximum size: 550 mm TL.

Material examined: CAS 153484 (4 al, 283-310 mm TL), Brazil, Pernambuco; MZUSP 48951 (3 al) (1 c&s), Brazil, Maranhão, São Luís, rio Curuçá; MZUSP 87700 (1 c&s), Brazil, Sergipe; MZUSP 51695 (4 al) (2 es), Brazil, Maceió, Alagoas, lagoa Mundaú.

***Sciades leptaspis* (Bleeker, 1862)**

Hexanematichthys leptaspis Bleeker, 1862: 27, pl. 65. Type locality: SW New Guinea. Holotype: RMNH 3060.

Distribution: Southern New Guinea and northern Australia.

Countries: Indonesia, Papua New Guinea and Australia.

Habitat: Predominantly brackish waters.

Maximum size: 650 mm of TL.

Material examined: AMS I.27420-001 (1 c&s), Australia, Northern Territory, Jabiru, Long Harry's Billabong; AMNH 58993 (4 al, 61-83 mm TL), Papua New Guinea, Madang, Ramu River at Bunapas mission, boat launch area, 45 km upstream of mouth; UMMZ 214017 (1 al, 163 mm TL), Papua New Guinea, Mira Point, Purari River delta.

***Sciades mastersi* (Ogilby, 1898)**

Arius mastersi Ogilby, 1898: 34. Type locality: Darwin, Northern Territory, Australia. Holotype: AMS I.25690-001.

Arius sagoroides Hardenberg, 1941: 221, fig. 2. Type locality: Merauke, Irian Jaya, Indonesia. No types known.

Tachysurus (Pararius) godfreyi Whitley, 1941: 221, fig. 2. Type locality: Darwin, Northern Territory, Australia. Holotype: AMS I.5270.

Distribution: Southern New Guinea and northern Australia.

Countries: Indonesia, Papua New Guinea and Australia.

Habitat: Marine and brackish waters.

Maximum size: 510 mm TL.

Material examined: MZUSP 38654 (1 al, 302 mm SL), Papua New Guinea, mouth of Chapman River.

***Sciades passany* (Valenciennes, 1840)**

Bagrus passany Valenciennes in Cuvier & Valenciennes, 1840a: 458. Type locality: French Guiana. Holotype: MNHN A-9399.

Distribution: North and northeastern South America.

Countries: Venezuela, Guyana, Surinam, French Guiana and Brazil.

Habitat: Marine and brackish waters.

Material examined: MZUSP 87701 (1 c&s), Brazil, Pará.

***Sciades paucus* (Kailola, 2000)**

Arius paucus Kailola, 2000: 141, figs. 12-13. Type locality: Flinders River near Maxwellton, 20°47'S, 142°43'E, Queensland, Australia. Holotype: QM I.12910. Paratypes: AMS I.25315-001 [ex IB.3159/2882], CAM F.36, NTM S.1775, S.12070-001, S.12083-001, QM I.11364, I.11990, I.12757, I.1730, I.16735, I.16737-78.

Distribution: Northern Australia

Countries: Australia

Habitat: Freshwater

***Sciades platypogon* (Günther, 1864)**

Arius platypogon Günther, 1864: 147. Type locality: San José, Guatemala. Syntypes: BMNH 1964.1.26.316-319.

Netuma mazatlana Gilbert, 1904: 225, pl. 25. Type locality: Mazatlán, Sinaloa, western Mexico. Holotype: SU 7138.

Distribution: Western America.

Countries: Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama and Colombia.

Habitat: Marine.

Maximum size: 450 mm TL.

Material examined: LACM W58-36 (8 al, 185-227 mm TL) (1 c&s), Mexico, Nayarit, San Blas, baia Matenchen.

***Sciades proops* (Valenciennes, 1840)**

Bagrus proops Valenciennes in Cuvier & Valenciennes, 1840a: 457. Type locality: Guianas. Syntypes: MNHN A-9331 to 9333, Puerto Rico; MNHN B-0245, Cayenne; MNHN B-0618 Cayenne.

Distribution: North and eastern South America.

Countries: Colombia, Venezuela, Guyana, Surinam, French Guiana and Brazil.

Habitat: Brackish waters, but also in freshwaters.

Maximum size: 1.000 mm TL.

Material examined: MZUSP 87702 (1 al), Brazil, Pará, Vigia, fish market; MZUSP 52846 (1 al), Brazil, Maranhão, São Luís, ilha de São Luís, rio dos Cachorros; MZUSP 87703 (1 c&s), Brazil, Pará.

***Sciades sagor* (Hamilton, 1822)**

Pimelodus sagor Hamilton, 1822: 169, 376. Type locality: Bengal estuaries. No types known.

Bagrus sondaicus Valenciennes in Cuvier & Valenciennes, 1840a: 444. Type locality: Strait of Sonde. Holotype: MNHN B-0604.

Bagrus javensis Valenciennes in Cuvier & Valenciennes, 1840a: 445. Type locality: Java, Indonesia. No types known.

Bagrus doroides Valenciennes in Cuvier & Valenciennes, 1840a: 448, pl. 418. Type locality: Pondicherry, India, Bengal. Syntypes: MNHN A-8668, Pondicherry; MNHN A-9349 Ganges.

Distribution: South and southeast Asia.

Countries: Pakistan, India, Bangladesh, Thailand, Myanmar, Singapore and Indonesia.

Habitat: Marine and brackish waters.

Maximum size: 450 mm TL.

Material examined: UMMZ 225447 (2 al, 95-137 mm TL) (1 c&s), Thailand, Prachuab Khiri Khan gulf of Thailand shore at Ban Khlong Wan.

***Sciades seemanni* (Günther, 1864)**

Arius seemanni Günther, 1864: 147. Type locality: Central America (Pacific). Holotype: BMNH 1855.9.19.1107.

Tachisurus jordani Eigenmann & Eigenmann, 1888: 142. Type locality: Panama (Pacific). Syntypes: MCZ 4945.

Galeichthys gilberti Jordan & Williams in Jordan, 1895: 395, pl. 26. Type locality: Upper part of astillero at Mazatlán, Sinaloa, western Mexico. Holotype: USNM 29213. Paratypes: BMNH 1895.5.27.244-246, SU 1667, 11666-68, USNM 28161, 28210, 28213, 28221, 28232, 28276, 28304, ZMB 14043

Galeichthys eigenmanni Gilbert & Starks, 1904: 21, pl. 4, fig. 8. Type locality: Panama. Holotype: SU 6986. Paratypes: BMNH 1903.5.15.319-320, SU 12878-80, USNM 50379, ZMB 15858.

Galeichthys simonsi Starks, 1906: 764, figs. 1-2. Type locality: Callao, Peru. Holotype: USNM 53 466.

Distribution: Western America.

Countries: Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Ecuador and Peru.

Habitat: Marine and brackish waters.

Maximum size: 350 mm TL.

Material examined: FMNH 19791 (2 al, 282-343 mm TL), Panama, Chame Point; LACM W58-32 (12 al, 265-329 mm TL) (1 c&s), Mexico, Nayarit, San Blas.

***Sciades sona* (Hamilton, 1822)**

Pimelodus sona Hamilton, 1822: 172, 376. Type locality: Bengal estuaries. No types known.

Bagrus trachipomus Valenciennes in Cuvier & Valenciennes, 1840a: 442. Type locality: Bengal. Holotype: MNHN A-9346.

Hexanematichthys leptocassis Bleeker, 1861: 65. Type locality: Pinang, Malaysia. No types known.

Distribution: South and southeast Asia.

Countries: Pakistan, India, Sri Lanka, Thailand, Singapore, Indonesia and Philippines.

Habitat: Marine and brackish waters.

Maximum size: 920 mm TL.

Material examined: ANSP 74851 (3 al, 56-71 mm TL), India, Calicut; LACM 38131-50 (4 al, 178-320 mm TL), Pakistan, Sind; USNM 207092 (1 al, 117 mm TL), India; USNM 149731 (3 al, 111-131 mm TL), India, Travancore.

***Sciades utarus* (Kailola, 1990)**

Arius utarus Kailola, 1990: 12, fig. 4. Type locality: Murik Lakes, New Guinea. Holotype: AMS I.25406-001. Paratypes: AMS I.25406-002, WAM P.27846-001, P.27847-010, P.28224-001, QM I.21674, CSIRO C3532, KFRS 5517.01, RMNH 28814, SAMA F6254.

Distribution: Northern New Guinea.

Countries: Papua New Guinea.

Habitat: Mostly freshwater, but also in brackish water

Maximum size: 450 mm TL.

Species inquirendae

Netuma aulometopon Fowler, 1915: 204, fig. 1. Type locality: Surinam. Holotype: ANSP 8372. Paratypes: ANSP 8373-75.

Bagrus flavescens Valenciennes in Cuvier & Valenciennes, 1840a: 462. Type locality: Cayenne, French Guiana. Holotype: MNHN A-8566.

Hexanematichtys surinamensis Bleeker, 1862: 380. Type locality: Surinam. Holotype: RMNH 3055.

Species inquirendae in Ariidae

The species listed below are represented by rare specimens in museum collections that could not be examined and/or are very poorly described so that useful characters to ascertain their validity are not available.

Arius cous Hyrtl, 1859: 17. No localities given. No types known.

Arius molliceps Valenciennes in Cuvier & Valenciennes, 1840b: 108. No locality. No types known.

Identification key to genera

This key is based on the use of external morphological characters allowing for the identification of taxa without the need of osteological preparations. Being artificial, it has to be used from its beginning since generic identification can be reached through different entries.

1. Maxillary barbel present 2
- Maxillary barbel absent *Batrachocephalus*
2. Mental barbels present; maxillary barbel soft, fleshy along its entire length 3
- Mental barbels absent; maxillary barbel hard, bony along its entire length *Osteogeneiosus*
3. Two pairs of mental barbels; maxillary barbel cylindrical 4
- A single pair of mental barbels; maxillary barbel compressed, tape-like *Bagre*
4. Cephalic shield clearly exposed, ornamented with grooves, ridges and granules, covered by a very thin layer of skin; anterior and median nuchal plates indistinct; posterior cleithral process and second dorsal process of cleithrum distinct and pointed 5
- Cephalic shield only slightly exposed, covered by musculature and thick skin; anterior and median nuchal plates conspicuous; posterior cleithral process and second dorsal process of cleithrum connected by a bony blade *Galeichthys*
5. Premaxillary and dentary with several rows of conical, viliform or molar-like teeth 6
- Premaxillary and dentary teeth with a single row of incisiform teeth *Ketengus*

6. Adipose fin long, its base as long as anal-fin base	7
- Adipose fin moderately long or short, its base no longer than one-half the length of anal-fin base	13
7. Anterior and median nuchal plates very reduced, forming a structure of semi-lunar aspect; posterior margin of occipital process concave; occipital process triangular shaped, moderately long and wide; accessory tooth plates bearing small conical teeth	8
- Anterior and median nuchal plates very large, square to pentagonal shaped; posterior margin of occipital process convex; occipital process round, very short and wide at base; accessory tooth plates large, bearing molar-like teeth	<i>Aspistor</i>
8. Tooth plates associated with vomer present	9
- Tooth plates associated with vomer absent	10
9. Posterior cleithral process very short; accessory tooth plates transversely elongated and narrow	<i>Hemiaris</i>
- Posterior cleithral process moderately long; accessory tooth plates large, triangular, oval or round	<i>Notarius</i>
10. Posterior cleithral process very long; posterior cranial fontanel long and narrow	11
- Posterior cleithral process short or moderately long; posterior cranial fontanel wide and oval	12
11. Accessory tooth plates present	<i>Cinetodus</i>
- Accessory tooth plates absent	<i>Pachyula</i>
12. Fenestra limited by supraoccipital, pterotic and sphenotic present; posterior cranial fontanel very large; posterior cleithral process very short	<i>Cephalocassis</i>
- Fenestra limited by supraoccipital, pterotic and sphenotic absent; posterior cranial fontanel large; posterior cleithral process moderately long	<i>Amphiarius</i>
13. Accessory tooth plates bearing large molar-like teeth	14
- Teeth of the accessory tooth plates small or absent, when present conical or viliform	16
14. Adipose fin very short, its base less than one-half length of anal-fin base; medial groove of neurocranium limited by frontal bones and also on supraoccipital; posterior cranial fontanel very reduced or absent .	15
- Adipose fin moderately long, its base about one-half as long as anal-fin base; medial groove of neurocranium mostly or exclusively on supraoccipital; posterior cranial fontanel conspicuous, long and narrow ...	<i>Arius</i>
15. Lateral line bifurcated at caudal region; posterior cleithral process moderately long	<i>Plicofollis</i>
- Lateral line not bifurcated at caudal region; posterior cleithral process very short	<i>Cathorops</i>
16. Lateral line not bifurcated at caudal region	17
- Lateral line bifurcated at caudal region	28
17. Temporal fossa present; fontanel limited by lateral ethmoid and frontal well developed, moderate to large	18
- Temporal fossa absent; fontanel limited by lateral ethmoid and frontal very reduced or inconspicuous	<i>Sciades</i>
18. Medial groove of neurocranium limited by frontal and/or supraoccipital, rudimentary or absent	19
- Medial groove of neurocranium limited by frontal and/or supraoccipital, very distinct	22
19. Posterior cleithral process very short; posterior cranial fontanel very large	20
- Posterior cleithral process moderately long; posterior cranial fontanel moderate to large	21
20. Accessory tooth plates absent	<i>Nedystoma</i>
- Accessory tooth plates present	<i>Doiichthys</i>
21. Posterior cranial fontanel oval and well developed; mesethmoid moderately wide at region of anterior nostrils	<i>Potamosilurus</i>
- Posterior cranial fontanel relatively long and narrow; mesethmoid very wide at region of anterior nostrils	<i>Cochlefelis</i>

22. Epioccipital not invading dorsal portion of cephalic shield	23
- Epioccipital invading dorsal portion of cephalic shield	<i>Carlarius</i>
23. Adipose fin very short, its base less than one-half length of anal-fin base	24
- Adipose fin moderately long, its length about half as long as anal-fin base	25
24. Tooth plates associated with vomer present	<i>Brustarius</i>
- Tooth plates associated with vomer absent	<i>Cryptarius</i>
25. Posterior cleithral process moderately long; medial groove of neurocranium limited by frontal bones, but also on supraoccipital; posterior cranial fontanel reduced or absent or long and narrow	26
- Posterior cleithral process very short; medial groove of neurocranium limited mainly by supraoccipital; posterior cranial fontanel very large and oval	<i>Nemapteryx</i>
26. Posterior cranial fontanel well developed, long and narrow	27
- Posterior cranial fontanel very reduced or absent	<i>Genidens</i>
27. Tooth plates associated with vomer absent; accessory tooth plates very reduced or absent	<i>Potamarius</i>
- Tooth plates associated with vomer present; accessory tooth plates large	<i>Neoarius</i>
28. Tooth plates associated with vomer absent; adipose fin moderately long, its length about half as long as anal-fin base	<i>Arius</i>
- Tooth plates associated with vomer present; adipose fin very short, its base less than one-half length of anal-fin base	<i>Netuma</i>

New classification of the Ariidae

Family Ariidae Bleeker, 1862

Amissidens Kailola, 2004

Amissidens hainesi (Kailola, 2000)

Amphiarius new genus

Amphiarius phrygiatus (Valenciennes, 1840)

Amphiarius rugispinis (Valenciennes, 1840)

Arius Valenciennes, 1840

Arius acutirostris Day, 1877 – *sedis mutabilis*

Arius africanus Günther, 1867 – *sedis mutabilis*

Arius arenarius (Müller & Troschel, 1849) – *sedis mutabilis*

Arius arius (Hamilton, 1822)

Arius brunellii Zollezi, 1939 – *sedis mutabilis*

Arius burmanicus Day, 1870 – *sedis mutabilis*

Arius caelatus Valenciennes, 1840

Arius dispar Herre, 1926

Arius festinus Ng & Sparks, 2003 – *sedis mutabilis*

Arius gagora (Hamilton, 1822)

Arius jatius (Hamilton, 1822) – *sedis mutabilis*

Arius jella Day, 1877 – *sedis mutabilis*

Arius leptanotacanthus Bleeker, 1849 – *sedis mutabilis*

Arius macronotacanthus Bleeker, 1846 – *sedis mutabilis*

Arius maculatus (Thunberg, 1792)

Arius madagascariensis Vaillant, 1894

Arius malabaricus Day, 1877 – *sedis mutabilis*

Arius manillensis Valenciennes, 1840

Arius microcephalus Bleeker, 1855 – *sedis mutabilis*

Arius nenga (Hamilton, 1822) – *sedis mutabilis*
Arius oetik Bleeker, 1846 – *sedis mutabilis*
Arius subrostratus Valenciennes, 1840 – *sedis mutabilis*
Arius uncinatus Ng & Sparks, 2003 – *sedis mutabilis*
Arius venosus Valenciennes, 1840 – *sedis mutabilis*
Aspistor Jordan & Evermann, 1898
Aspistor luniscutis (Valenciennes, 1840)
Aspistor parkeri (Traill, 1832)
Bagre Cloquet, 1816
Bagre bagre (Linnaeus, 1766)
Bagre marinus (Mitchill, 1815)
Bagre panamensis (Gill, 1863)
Bagre pinnimaculatus (Steindachner, 1876)
Batrachocephalus Bleeker, 1846
Batrachocephalus mino (Hamilton, 1822)
Brustiarius Herre, 1935
Brustiarius nox (Herre, 1935)
Brustiarius proximus (Ogilby, 1898) – *sedis mutabilis*
Brustiarius solidus (Herre, 1935)
Carlarius new genus
Carlarius gigas (Boulenger, 1911) – *sedis mutabilis*
Carlarius heudelotii (Valenciennes, 1840)
Carlarius latiscutatus (Günther, 1864)
Carlarius parkii (Günther, 1864)
Cathorops Jordan & Gilbert, 1822
Cathorops agassizi (Eigenmann & Eigenmann, 1888)
Cathorops aguadulce (Meek, 1904)
Cathorops arenatus (Valenciennes, 1840)
Cathorops dasycephalus (Günther, 1864)
Cathorops fuerthii (Steindachner, 1877)
Cathorops hypophthalmus (Steindachner, 1877)
Cathorops mapale Betancur-R & Acero, 2005
Cathorops melanopus (Günther, 1864)
Cathorops multiradiatus (Günther, 1864)
Cathorops spixii (Agassiz, 1829)
Cathorops steindachneri (Gilbert & Starks, 1904)
Cathorops tuyra (Meek & Hildebrand, 19230)
Cephalocassis Bleeker, 1858
Cephalocassis bleekeri (Popta, 1900) – *sedis mutabilis*
Cephalocassis borneensis (Bleeker, 1851)
Cephalocassis manillensis (Valenciennes, 1840) – *sedis mutabilis*
Cephalocassis melanochir (Bleeker, 1852)
Cinetodus Ogilby, 1898
Cinetodus carinatus (Weber, 1913) – *sedis mutabilis*
Cinetodus froggatti (Ramsay & Ogilby, 1886)
Cochlefelis Whitley, 1941
Cochlefelis danielsi (Regan, 1908)

Cochlefelis dioctes (Kailola, 2000) – *sedis mutabilis*
Cochlefelis insidiator (Kailola, 2000) – *sedis mutabilis*
Cochlefelis spatula (Ramsay & Ogilby, 1886)
Cryptarius Kailola, 2004
Cryptarius daugueti (Chevey, 1932) – *sedis mutabilis*
Cryptarius truncatus (Valenciennes, 1840)
Doiichthys Weber, 1913
Doiichthys novaeguineae Weber, 1913
Galeichthys Valenciennes, 1840
Galeichthys ater Castelnau, 1861
Galeichthys feliceps Valenciennes, 1840
Galeichthys peruvianus Lütken, 1874 – *sedis mutabilis*
Genidens Castelnau, 1855
Genidens barbatus (Lacépède, 1803)
Genidens genidens (Cuvier, 1829)
Genidens machadoi (Miranda-Ribeiro, 1918)
Genidens planifrons (Higuchi, Reis & Araújo, 1982)
Hemiarius Bleeker, 1847
Hemiarius hardenbergi (Kailola, 2000) – *sedis mutabilis*
Hemiarius harmandi Sauvage, 1880 – *sedis mutabilis*
Hemiarius stormii (Bleeker, 1858)
Hemiarius sumatranus (Anonymous, 1830)
Hemiarius verrucosus (Ng, 2003) – *sedis mutabilis*
Ketengus Bleeker, 1847
Ketengus typus Bleeker, 1847
Nedystoma Ogilby, 1898
Nedystoma dayi (Ramsay & Ogilby, 1886)
Nemapteryx Ogilby, 1908
Nemapteryx armiger (De Vis, 1884)
Neoarius Castelnau, 1878
Neoarius augustus (Roberts, 1978) – *sedis mutabilis*
Neoarius berneyi (Whitley, 1941) – *sedis mutabilis*
Neoarius graeffei (Kner & Steindachner, 1867)
Neoarius midgleyi (Kailola & Pierce, 1988)
Neoarius pectoralis (Kailola, 2000) – *sedis mutabilis*
Netuma Bleeker, 1858
Netuma bilineatus (Valenciennes, 1840)
Netuma thalassinus (Rüppell, 1837)
Notarius Gill, 1863
Notarius armbrusteri Betancur-R & Acero, 2006 – *sedis mutabilis*
Notarius biffi Betancur-R & Acero, 2004 – *sedis mutabilis*
Notarius cookei (Acero & Betancur-R, 2002) – *sedis mutabilis*
Notarius grandicassis (Valenciennes, 1840)
Notarius insculptus (Jordan & Gilbert, 1883) – *sedis mutabilis*
Notarius kessleri (Steindachner, 1877) – *sedis mutabilis*
Notarius lentiginosus (Eigenmann & Eigenmann, 1888)
Notarius neogranatensis (Acero & Betancur-R, 2002) – *sedis mutabilis*

Notarius osculus (Jordan & Gilbert, 1883) – *sedis mutabilis*
Notarius planiceps (Steindachner, 1877)
Notarius troschelii (Gill, 1863)
Osteogeneiosus Bleeker, 1846
Osteogeneiosus militaris (Linnaeus, 1758)
Pachyula Ogilby, 1898
Pachyula conorhynchus (Weber, 1913) – *sedis mutabilis*
Pachyula crassilabris (Ramsay & Ogilby, 1886)
Plicofollis Kailola, 2004
Plicofollis argyroleuron (Kuhl & van Hasselt, 1840)
Plicofollis crossocheilos (Bleeker, 1846) – *sedis mutabilis*
Plicofollis dussumieri (Valenciennes, 1840)
Plicofollis magatensis (Herre, 1926) – *sedis mutabilis*
Plicofollis nella (Valenciennes, 1840)
Plicofollis platystomus (Day, 1877) – *sedis mutabilis*
Plicofollis polystaphylodon (Bleeker, 1846)
Plicofollis tenuispinis (Day, 1877)
Potamarius Hubbs & Miller, 1960
Potamarius grandoculis (Steindachner, 1877)
Potamarius izabalensis Hubbs & Miller, 1960
Potamarius nelsoni (Evermann & Goldsborough, 1902)
Potamosilurus new genus
Potamosilurus coatesi (Kailola, 1990) – *sedis mutabilis*
Potamosilurus latirostris (Macleay, 1883)
Potamosilurus macrorhynchus (Weber, 1913)
Potamosilurus robertsi (Kailola, 1990) – *sedis mutabilis*
Potamosilurus velutinus (Weber, 1907) – *sedis mutabilis*
Sciades Müller & Troschel, 1849
Sciades assimilis (Günther, 1864)
Sciades bonillai (Miles, 1945)
Sciades couma (Valenciennes, 1840)
Sciades dowii (Gill, 1863) – *sedis mutabilis*
Sciades emphysetus Müller & Troschel, 1849
Sciades felis (Linnaeus, 1766)
Sciades guatemalensis (Günther, 1864)
Sciades herzbergii (Bloch, 1794)
Sciades leptaspis (Bleeker, 1862)
Sciades mastersi (Ogilby, 1898) – *sedis mutabilis*
Sciades passany (Valenciennes, 1840)
Sciades paucus (Kailola, 2000) – *sedis mutabilis*
Sciades platypogon (Günther, 1864)
Sciades proops (Valenciennes, 1840)
Sciades sagor (Hamilton, 1822)
Sciades seemanni (Günther, 1864)
Sciades sona (Hamilton, 1822) – *sedis mutabilis*
Sciades utarus (Kailola, 1990) – *sedis mutabilis*

Discussion and comparison with previous classifications

The results obtained in this study are of primary importance for the systematics and taxonomy of the Ariidae for a long time a matter of controversy and misunderstanding among ichthyologists worldwide. The characterization of the genera, definition of their limits and species composition has been a great challenge within the systematics of the Siluriformes. Presently about 130 species are recognized as valid, but many need to be better characterized taxonomically. The difficulties in recognizing species identity and monophyletic taxa are mainly due to the wide geographic distribution of the group and the overall similarity in the external morphology of their representatives coupled with lack of adequate series of specimens in museum collections. Thus studies aimed at more comprehensive approaches on systematics and phylogeny of the Ariidae have not been entirely successful because of the above mentioned constraints.

Recently Kailola (1990a, 2004), Betancur-R & Mejía (2000), Betancur-R (2003), Betancur-R & Acero (2004) and Betancur-R *et al.* (2004) based on the cladistic method, presented a preliminary analysis of the phylogenetic relationships of part of the genera and species of the Ariidae. Kailola (1990a) in an unpublished doctoral thesis discussed the relationships and zoogeography of the marine catfishes from New Guinea and Australia and Betancur-R & Mejía (2000) and Betancur-R (2003) did a similar study as part of the requirements for completion of the undergraduate program and a master's dissertation respectively (not published) in Colombia and adjacent tropical waters. In both cases the authors examined only a geographically restricted subset of the recognized species and genera, limited to the areas above mentioned. Those studies included only a small number of species from African coasts, South America and Indian Ocean and did not redefine the complex genus *Arius*. The results obtained by Kailola (1990a) are essentially repeated in Kailola (2004) and the results obtained by Betancur-R & Mejía (2000) are presented in Betancur-R *et al.* (2004), but only part of the information contained in Betancur-R (2003) is included in Betancur-R & Acero (2004). In an unpublished Ph.D. study, Marceniuk (2003) included the largest number of ariid species ever assembled from different geographic areas of the world and used a vast array of morphological characters to study the systematics and phylogeny of the group.

The present work is based on the results obtained by Marceniuk (2003). All nominal genera are revised and redefined through exclusive osteological characters and a combination of internal and external morphological characters. Based on examination of the type-species the following genera are considered valid: *Arius*, *Aspistor*, *Bagre* Cloquet 1816, *Batrachocephalus*, *Brustiarius*, *Cathorops*, *Cephalocassis*, *Cinetodus*, *Cochlefelis*, *Cryptarius*, *Doiichthys*, *Galeichthys*, *Genidens*, *Hemiaris*, *Ketengus*, *Nedystoma*, *Nemapteryx*, *Neoarius*, *Netuma*, *Notarius*, *Osteogeneiosus*, *Pachyula* and *Sciades*. The genera *Plicofollis* and *Potamarius* are considered valid through examination of species morphologically similar to the type-species. Representative material of *Amissidens* species-type was not examined and the genus is recognized exclusively on the basis of evidences presented by Kailola (2004). *Amphiarius*, *Carlarius* and *Potamosilurus* are described as new genera. The nominal genera *Ailurichthys*, *Anemanotus*, *Ariopsis*, *Bagre* Oken 1817, *Felichthys*, *Glanis*, *Guiritinga*, *Hemipimelodus*, *Hexanematichthys*, *Pseudarius*, *Sciadeichthys*, *Sciadeops*, *Selenaspis*, *Septobranchus* and *Stearopterus* are considered junior synonyms based on examination of the type-species and *Lep-tarius* and *Pararius* are considered junior synonyms based on examination of the type-species not cleared and stained. *Ariodes* and *Tetranesodon* are considered junior synonyms based on data presented by Kailola (2004). *Breviceps* Swainson, 1838 and *Mystus* Gray, 1854 are junior homonyms of names available for the genus-group and thus rejected. *Catastoma* and *Sarcogenys* are considered *nomina nuda* and designated as synonyms of *Netuma*, in agreement with Kailola (2004). *Glanide* is not a Latin name and was not considered. The nominal genera *Ancharius*, *Paradiplomystes* and *Tachysurus*, previously included in the family are not recognized as members of the Ariidae.

The new classification proposed contains many modifications in relation to previous ones and the *status* of nominal genera as well as species composition are in many instances entirely changed. The species treated

as *sedis mutabilis* (see New classification of the Ariidae) were not examined and their inclusion in the respective genera is preliminary. In this section conflicts between the new and previous classifications are discussed and brief considerations about former concepts of genera and species composition are made. Classifications proposed by Kailola (2004), Betancur-R & Acero (2004) and Betancur-R *et al.* (2004) based on recognition of genera as monophyletic units as well as more recent and historically important classifications are discussed.

The genera *Amissidens* and *Cryptarius* are considered valid and the species included in them are those recognized by Kailola (2004). Previously *C. truncatus* was included in *Arius* (Burgess, 1989; Kottelat *et al.*, 1993; Rainboth, 1996; Martin-Smith & Tan, 1998; Kailola, 1999; Tan & Ng, 2000; Kailola, 2000a; Ng, 2003) and *C. daugueti* in *Hemipimelodus* (Désoutter, 1977; Rainboth, 1996).

Amphiarius is a new genus established to accommodate *A. rugispinis* and *A. phrygiatus* previously included in a distinct genus not formally named by Marceniuk (2003). In Marceniuk & Ferraris (2003) these two species were preliminary included in *Arius*, following Taylor & Menezes (1977), Burgess (1989), Cervigón (1992), Le Bail *et al.* (2000), Camargo & Isaac (2001) and Acero (2003), decision also chosen by Kailola (2004) who examined only *A. rugispinis*, but suggested that they could be part of a separate genus she never designated. Betancur-R & Acero (2004), however, considered *A. rugispinis* to belong in *Notarius* based on mitochondrial information.

One of the major problems in ariid systematics has been the delimitation of the genus *Arius*. It has been considered a very inclusive genus where ariid species not clearly defined were preliminary accommodated in the past. Kailola (1999) and Acero (2003) recognized *Arius* as a non monophyletic assemblage pointing out the enormous difficulty in defining the genus. Recent attempts to bring ariid generic concepts to a better understanding using phylogenetic systematics (Kailola, 2004; Betancur-R & Acero, 2004) did not consider all the species tentatively included in *Arius* to circumscribe the genus or to define its monophyletic condition. As defined in the present study *Arius* is senior synonym of *Ariodes* and *Pseudarius* and include twenty one species occurring from eastern Africa and western Madagascar to south and southeast Asia. All the included species can be easily told apart from the remaining ariid species occurring in the Americas, New Guinea and Australia by the typical bifurcation of the lateral line at the caudal region reaching the bases of the upper and lower caudal-fin lobes (*versus* lateral line simple, not bifurcated at the caudal region reaching or not the bases of the upper caudal-fin lobe) except for the species of the genus *Bagre* in which, however, there are one pair of mental barbels (*versus* two pairs in the *Arius* species). *Arius* species are different from ariid species belonging to Indian Ocean genera by having the adipose fin of moderate length, about half as long as the anal fin (*versus* adipose fin short, less than half the length of the anal fin, characteristic of *Netuma* and *Plicofollis*), maxillary barbels present and always developed (*versus* maxillary barbels absent in *Batrachcephalus* and rudimentary in *Ketengus*) and mental barbels present (*versus* mental barbels absent in *Osteogeneiosus*). The apomorphic or plesiomorphic condition of these characters as well as monophyly of *Arius* will be discussed in Marceniuk & Menezes (in preparation). In the present work only morphological features that are useful to distinguish the species of *Arius* from the species of the remaining genera are emphasized.

In *Aspistor* we recognize *A. luniscutis* and *A. parkeri*. Betancur-R & Acero (2004) without examining the type-species, considered *Aspistor* as junior synonym of *Notarius*, admitting that *Aspistor parkeri* (= *Arius quadriscutis*) would be the basal most species within *Notarius*, a condition that would justify its recognition as subgenus. Kailola (2004), based on data in Acero & Betancur-R (2002a, 2002b) and Aguilera & de Aguilera (2004), recognized *Aspistor* as valid and included in it eight species from South and Central America and one from New Guinea. In her phylogenetic analysis she examined only *Arius hardenbergi* Kailola, 2000 considered in the present study to belong in *Hemiaris*. The remaining species included by Kailola (2004) in *Aspistor*, except *A. luniscutis* and *A. parkeri* are herein considered to belong in *Notarius* or *Sciades*. In older classifications *A. luniscutis* and *A. parkeri* are *Arius* species (Taylor & Menezes, 1977; Burgess, 1989; Cervigón, 1992; Le Bail *et al.*, 2000; Camargo & Isaac, 2001; Acero, 2003).

Bagre Cloquet, 1816 is senior synonym of *Bagre* Oken, 1817, *Glanis*, *Stearopterus*, *Breviceps* non Mer-

rem, 1820, *Felichthys* (replacement for *Breviceps*), *Ailurichthys*, *Mystus non* Scopoli, 1777 and *Anemanotus* following previous classifications (Castro-Aguirre *et al.*, 1999; Marceniuk & Ferraris, 2003; Kailola, 2004). Very little changes have occurred in the species composition of the genus. In older publications the species were included either in *Felichthys* (Jordan & Evermann, 1896; Eigenmann, 1912; Meek & Hildebrand, 1923; Fowler, 1951) or in *Ailurichthys* (Günther, 1864; Jordan & Gilbert, 1883; Eigenmann & Eigenmann, 1890; Regan, 1907) with the list of species included remaining essentially the same except for those herein considered as junior synonyms.

Batrachcephalus, *Ketengus* and *Osteogeneiosus* are considered valid as previously recognized by several authors (Jayaram & Dhanze, 1978; Jayaram, 1982, 1884; Jayaram & Dhanze, 1986; Talwar & Jhingran, 1991; Kottelat *et al.*, 1993; Manilo & Bogorodsky, 2003; Kailola, 2004). The condition of monospecific genera is maintained due to the presence of a large number of exclusive characters in the respective type-species.

Brustiarius is considered senior synonym of *Pararius* and includes *B. nox*, *B. proximus* and *B. solidus*. Kailola (2004) recognized the monophyly of the genus, but did not include *B. proximus* that was considered to belong in *Netuma*, whereas *Pararius* was designated junior synonym of *Netuma*. In previous classifications *Brustiarius* was considered junior synonym or subgenus of *Arius* in which the species now in *Brustiarius* were included (Burgess, 1989; Kailola, 1990b, 1999, 2000b; Allen, 1991; Allen *et al.*, 1992; Larson & Williams, 1997; Hutchins, 2001).

The ariid species from the African west coast formerly included in *Arius* (Fowler, 1936; Taylor, 1986, 1990; Burgess, 1989; Daget, 1992) are allocated into a new genus named *Carlarius*.

The species composition of *Cathorops* proposed by Marceniuk & Ferraris (2003) is maintained, including *C. dasycephalus*, recently referred to *Arius* (Bussing & Lopez, 1994; Kailola & Bussing, 1995; Betancur-R, 2003) or to *Ariopsis* (Nelson *et al.*, 2004). Evidences that *Cathorops* is monophyletic are presented by Marceniuk (1997) based on the study of most species of the genus and this was confirmed by Betancur-R *et al.* (2004) and Kailola (2004) although examining a restricted number of species.

Cephalocassis is recognized as senior synonym of *Hemipimelodus* and includes *C. bleekeri*, *C. borneensis*, *C. manillensis* and *C. melanochir*. Kailola (2004) agrees with the synonymy, but considers *Cephalocassis* represented only by *C. borneensis* and *C. melanochir*. *C. bleekeri* is included in *Nemapteryx* by Kailola (2004). *Hemipimelodus*, however, is considered valid by Désoutter (1977), Jayaram & Dhanze (1978), Jayaram (1982), Burgess (1989) and Roberts (1989).

Cinetodus and *Pachyula* are considered valid based on characters present in the respective type-species. *Cinetodus* is represented by *C. carinatus* and *C. froggatti* and *Pachyula* by *P. crassilabris* and *P. conorhynchus*. Kailola (2004) recognized *Cinetodus* and *Pachyula* synonyms and included all the species mentioned above in *Cinetodus*, but in Kailola's phylogenetic analysis *Cinetodus* is considered paraphyletic not justifying the inclusion of the species in a single genus and contradicting this synonymy. The species herein included in *Cinetodus* and *Pachyula* were considered sister-species by Kailola (2004), a condition that would make the two genera valid (Marceniuk, 2003). The nominal genus *Tetranesodon* considered synonym of *Cinetodus* by Kailola (2004), is recognized by us as junior synonym of *Pachyula*.

Cochlefelis includes four species from southern New Guinea and northern Australia. The recognition of *C. danielsi* and *C. spatula* is in agreement with previous classifications (Roberts, 1978; Allen, 1991; Kailola, 2004). However, including *C. dioctes* formerly considered to belong in *Arius* (Ng, 2003) or in *Hemiaris* (Kailola, 2004) and *C. insidiator*, previously in *Hemiaris* (Kailola, 2004), represents a new arrangement. Kailola (2004) also included *Arius burmanicus* in *Hemiaris* considered by us to belong in *Arius*.

Nedystoma dayi and *Doiichthys novaeguineae* have been considered sister-species by Marceniuk (2003), a conclusion also reached by Kailola (2004) who considered *Nedystoma* senior synonym of *Doiichthys*. In the present paper the two genera are not considered synonyms. The respective type-species possess a large number of exclusive characters justifying their monospecific condition as previously recognized (Roberts, 1978; Burgess, 1989; Allen, 1991).

Galeichthys includes *G. ater* and *G. felis* from South Africa and *G. peruvianus* from the Peruvian coast in the Pacific Ocean, following previous classifications (Hildebrand, 1946; Taylor, 1986, 1990; Pequeño, 1989; Bianchi *et al.*, 1993; Kailola & Bussing, 1995; Chirichigno & Vélez, 1998; Castro-Aguirre *et al.*, 1999; Marceniuk & Ferraris, 2003; Heemstra & Heemstra, 2004; Nelson *et al.*, 2004; Kailola, 2004). The species from east and west American coasts attributed to *Galeichthys* by Regan (1907) and Meek & Hildebrand (1923) are included in *Cathorops*, *Notarius* and *Sciades*.

Genidens was established and remained until very recently as a monospecific genus. As defined in this study it is senior synonym of *Guiritinga* and also includes *Genidens barbatus*, *G. planifrons* and *G. machadoi* following Marceniuk & Ferraris (2003) and Marceniuk (2005a, 2005b). In previous classifications *G. barbatus* and *G. planifrons* were part of *Netuma* (Figueiredo & Menezes, 1978; Higuchi *et al.*, 1982; Burgess & Finley, 1996; Pequeño, 1997; López *et al.*, 2002). Higuchi *et al.* (1982) questioned the inclusion of these species in *Netuma* hoping that in future systematic studies the name *Guiritinga* would be resurrected. Apparently Higuchi *et al.* (1982) expectations motivated Kailola (2004) to recognize *Guiritinga* to accommodate *Genidens barbatus* and *G. planifrons*. *Guiritinga* is not recognized by Kailola (2004) as a monophyletic group.

Hemiaris is considered a valid genus for *H. hardenbergi*, *H. harmandi*, *H. stormii*, *H. sumatranus* and *H. verrucosus*. Kailola (2004) based on the examination of *H. stormii* and two other species herein included in *Cochlefelis* (*C. dioctes* and *C. insidiator*) considered *Hemiaris* monophyletic. *Hemiaris verrucosus*, *Notarius grandicassis* and *Sciades sona* were additionally included in *Hemiaris* by Kailola (2004).

Our analysis indicates that *Nemapteryx* is monospecific. Kailola (2004) includes in this genus five species herein allocated to the genera *Arius*, *Neoarius* and *Cephalocassis*. As revealed by the topology of the consensus cladogram presented by Kailola (2004), the genus cannot be considered monophyletic.

Neoarius is resurrected and includes *N. augustus*, *N. berneyi*, *N. graeffei*, *N. midgleyi* and *N. pectoralis* all restricted to southern New Guinea and northern Australia. With exception of *N. augustus*, included by Kailola (2004) in *Nemapteryx*, the other species were considered by her to belong in *Ariopsis*.

Bagre thalassinus Rüppell, 1837 distributed from eastern Africa, south and southeast Asia to New Guinea and northern Australia (Kailola, 1986) is the type-species of *Netuma*. As defined by Kailola (2004) *Netuma* included *N. bilineatus*, *Arius proximus* (herein included in *Brustarius*) and *N. thalassinus* and is not monophyletic. In the present work only the species from the Indo-Pacific should be included in *Netuma* following Taylor (1986), Hutchins (2001) and Kailola (2004). The inclusion of species from the Western South Atlantic belonging to *Genidens* (Figueiredo & Menezes, 1978; Higuchi *et al.*, 1982) and from the eastern and western American coasts belonging to *Notarius* and *Sciades* (Jordan & Evermann, 1898; Gilbert & Starks, 1904; Starks, 1906; Meek & Hildebrand, 1923) is not corroborated by us. *Catastoma* and *Sarcogenys* are considered *nomina nuda* and junior synonyms of *Netuma* as demonstrated by Kailola (2004).

Notarius is valid (Marceniuk & Ferraris, 2003; Betancur-R & Acero, 2004) in disagreement with Kailola (2004) who recognizes *Notarius* as a junior synonym of *Hemiaris*. The species composition of the genus, however, differs from that presented by Betancur-R & Acero (2004) by not including *Amphiaris rugispinis* and *Aspistor parkeri* (= *Arius quadriscutis*) and adding *Notarius osculus*, considered by Betancur-R & Acero (2004) as of uncertain status and included in previous classifications in *Arius* (Burgess, 1989; Bussing & López, 1994; Kailola & Bussing, 1995; Acero & Betancur-R, 2002a) or *Hexanematichthys* (Marceniuk & Ferraris, 2003). The nominal genus *Sciadeops*, recognized as junior synonym of *Sciades* by Kailola (2004), is considered junior synonym of *Notarius*.

Kailola (2004) described *Plicofollis* in which *P. argyroleuron*, *P. crossocheilos*, *P. dussumieri*, *P. layardi* (= *Arius tenuispinis*), *P. nella* and *P. polystaphilodon* were included. We added into the genus *P. platystomus* that share with the other species of *Plicofollis* a unique combination of characters considered apomorphic by Marceniuk (2003).

Two species entirely confined to the freshwaters of North and Central America were allocated in *Potamarius*, a genus originally described by Hubbs & Miller (1960). Its type-species was previously included in

Conorhynchus of the family Pimelodidae (Meek, 1904; Regan 1907). *Potamarius grandoculis* was considered to belong in *Hexanematichthys* by Figueiredo & Menezes (1978) and in *Arius* by Burgess (1989), but its inclusion in *Potamarius* is in agreement with previous classifications proposed by Marceniuk & Ferraris (2003) and Marceniuk, (2005b).

Potamosilurus is herein created for the species occurring exclusively in freshwater in New Guinea. *P. coatesi*, *P. latirostris*, *P. macrorhynchus* and *P. robertsi* are found in south-draining rivers and *P. velutinus* in north-draining rivers of New Guinea. With exception of *P. macrorhynchus*, recognized as *incertae sedis*, the remaining species were included in *Ariopsis* by Kailola (2004).

Hexanematichthys, *Sciadeichthys*, *Selenaspis*, *Ariopsis* and *Leptarius* are synonyms of *Sciades*, but have been recently considered either valid or placed in the synonymy of genera other than *Sciades* (Roberts, 1989; Kailola, 1990a; Castro-Aguirre *et al.*, 1999; Acero, 2003; Marceniuk & Ferraris, 2003; Betancur-R *et al.*, 2004; Kailola, 2004). In this study the species belonging to *Ariopsis* (Acero, 2003; Kailola, 2004, in part), *Hexanematichthys* and *Selenaspis* (Acero, 2003; Betancur-R *et al.*, 2004; Kailola, 2004) and *Arius* (Betancur-R *et al.*, 2004, in part) are all included in *Sciades* based on the possession of the following exclusive characters within the Ariidae: otic capsules little developed; space between transcapular process and otic capsule very wide; temporal fossa very reduced or entirely closed; subvertebral process indistinct or little differentiated. *Sciades* was considered valid by Castro-Aguirre *et al.* (1999), whereas Marceniuk & Ferraris (2003) recognized this genus as probably senior synonym of *Hexanematichthys*. Kailola (2004) recognized *Sciades* based exclusively on examination of the type-species, considered by her sister-species of *Hemiarus hardenbergi*, additionally adding into the genus *S. couma*, *S. herzbergii*, *S. dowii*, *S. parkeri*, *S. passany*, *S. proops* and *Notarius troschelii*.

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